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180

CONTENTS

TRADE NAME	MODEL	SET AND FOLDER No.
Admiral	Ch. 21F1, 21G1, 21K1, 21M1, 21N1, 21P1, 21Q1 Tel. Rec. Prod. Chg. Bul. 46	180-1
Admiral	121K15A, 16A, 17A, 121M10, 11A, 12A, 221K45A, 46A, 47A, (Ch. 22M1), 321M25A, 26A, 27A, 421M15A, 16A, 35, 36, 37 (Ch. 22Y1), 520M11, 12 (Ch. 22A2A), 520M15, 16, 17 (Ch. 22A2), 521M15A, 16A, 17A (Ch. 22Y1) Tel. Rec.	180-2
Fada	20C22, 20T12, 24T10 Tel. Rec.	180-3
Firestone	13-G-110 (Code 334-2-MS29A) Tel. Rec.	180-4
General Electric	17C110, 17C111 (Early, "D" & "W" Versions) Tel. Rec.	180-5
Hallicrafters	S-78A (Run 1)	180-6
Hallicrafters	1000 (Ch. W1000D), 1008 (Ch. X1000D), 1019 (Ch. Z1000D) Tel. Rec.	180-7
Scott	1000	180-8
Steelman	AF1100	180-9
Truetone	2D1185E Tel. Rec. Prod. Chg. Bul. 46	180-1
Westinghouse	H-660C17, H-661C17 (Ch. V-2203-1) Tel. Rec. Prod. Chg. Bul. 46	180-1
Wilcox-Gay	2A10, 2A10B, 2A11, 2A11B Recorder	180-10

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SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 2 IN SET #135

Run 18 and Run 19

The following production changes were made on Admiral Chassis 21K1 stamped run 18 and chassis. 21F1, 21G1, 21M1, 21N1, 21P1 and 21Q1 stamped run 19.

R39 and C28 was removed from B+ supply to pin #10 (accelerating anode) of picture tube.

R49 and C39 was removed from B+ plate circuit of the AF Amp. (V10, 6AV6), also, R48 was changed to 470K.

Run 22

All 21 series chassis stamped run 22 had the following changes made in the Video Amp. circuit to improve picture definition.

Peaking coil (L-15) Part #73A5-9 (gray dot) was replaced by peaking coil part #73A11-1 having a three pi winding.

Peaking coil (1-14) part #73A5-13 (white dot) was replaced by peaking coil part #73A5-14 (Blue dot). The resistor on which the new peaking coil is wound is changed to 18K.

A 4.5MC trap coil with a 6.8MMFD capacitor in series part #72B99-3 is connected between pin #4 of the video amp. (6AC7) and chassis ground. The 6.8MMFD capacitor connects to pin 4 of 6AC7.

In later production sets a 4700Ω ½ watt resistor was added cross peaking coil L12 to prevent possible "ringing" in picture. In very late production sets the 4700Ω resistor and peaking coil L12 are a single unit part #73A5-15.

(Continued on reverse side)

ADMIRAL CHASSIS
21F1, 21G1, 21K1, 21M1, 21N1, 21P1, 21Q1

SUPPLEMENTAL DATA FOR PHOTOFACT FOLDER 12 IN SET #157

TV Chassis. V-2203-1

The following changes was made in later production of Westinghouse Models H-660C17 and H-661C17, Ch. V-2203-1

HORIZONTAL HOLD

Some chassis have a 2.2MegΩ resistor added in parallel with R98 in the horizontal hold circuit to provide the correct hold range.

In later production, however, this method is discontinued and an adjustment is provided by changing C86 connected between pins #1 and #7 of the horizontal multivibrator to 100MMF and adding a 4 to 40MMF trimmer capacitor in parallel with the new C86.

To adjust the trimmer, short out the ringing coil (L31), set the horizontal hold control approximately to its mid-position and adjust the trimmer until the picture is in horizontal sync. Then, without touching the the hold control remove the short from across the ringing coil, and adjust the ringing coil until the picture is again in horizontal sync.

RF "TWEET" INTERFERENCE

To eliminate a possible source of 4.5MC "tweet" interference on the picture, RF decoupling of the tone control is provided by adding 150Ω resistor between the tone control jack and C64.

PICTURE WIDTH

To obtain sufficient width in some chassis, the screen dropping resistance for the 6AU5GT horizontal output tube is decreased to approximately 10,000 ohms by adding a 56,000 ohm 1 watt resistor in parallel with the 12,000 ohm screen resistor (R104) or by using a 10,000 ohm 10 watt resistor in place of the 12,000 ohms resistor.

(Continued on reverse side)

WESTINGHOUSE MODELS
H-660C17, H-661C17 (Ch. V-2203-1)

PRODUCTION CHANGES
BULLETIN 46

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ADMIRAL CHASSIS
21F1, 21G1, 21K1, 21M1, 21N1, 21P1, 21Q1, (Cont).

Run 23	Chassis 21K1, 21L1, 21M1 and 21N1 stamped run 23 has the horizontal output tube V17 changed to a 6CD6G. When the 6CD6G tube is used the capacitor C61 (across width coil) is omitted. The 470K resistor across the horizontal drive trimmer was changed to 1Meg. The 6800Ω 2 watt resistor was replaced by two 3,300Ω 2 watt resistors in series.
Run 24	Chassis 21M1 stamped run 24 has a filter added to eliminate or reduce to a minimum the brightness of shadow-type vertical bars which may appear at the left side of picture. This filter consists of a 680Ω 2 watt resistor, a .0068MFD capacitor, and a RF choke part #73B8-2. These components are all connected in parallel and connected between terminal #4 of the horizontal output transformer and pin #5 of the damper tube 6W4GT.
Run 25	Changes were made in all 21 series chassis stamped Run 25 to eliminated possible flashing (white horizontal bars in picture) and also improve sync stability in weak signal areas. The resistor connected between pin 1 and pin 6 of the AGC keying tube 6AV6 was changed to 270K. In the AGC lead to the TV tuner resistor R17 (1000Ω) was omitted and the .001MFD (C19) capacitor was changed to .47MFD 100 volts.
Run 26	Changes were made in 21F1, 21G1 and 21M1 chassis stamped Run 26 to prevent possible horizontal jitter in strong signal areas. In some chassis stamped Run 25 and Run 26, pin 3 of sync separator V12 was connected to one end of picture control (R1). In later production sets, pin 3 of V12 was connected directly to chassis ground and a terminal of R1 is unused.

WESTINGHOUSE MODELS
H-660C17, H-661C17 (Ch. V-2203-1)(Cont)

VERTICAL HOLD

To improve the vertical hold R77 at the input to the intergrating network is changed to 2700 ohms, and a 47KΩ resistor is added between the grid (pin#4 of V16 and ground.

SOUND MODULATED PICTURE "BOUNCE"

The following changes are incorporated to eliminate jumpy pictures when volume control is set for maximum audio output:

1. Remove the wire that connects pin #6 of the 6AU6 keyed AGC tube to the 130 volt B plus line.
2. Connect a 15K ohm 5 watt resistor between the 320 Volts B plus line and the junction of pin # 6 of the 6AU6 keyed AGC tube, R70, and R71.
3. Change C28 connected between pin #6 of the 6AQ5 audio putput tubes and ground, to 30MFD by disconnecting the 10MFD section and adding a separate 30MFD-450V capacitor.
4. Connect to 10MFD section of the capacitor to the pin #6 of the 6AU6 keyed AGC tube.
5. Remove R66 (8K 10watts) from the chassis. This resistor previously connected between pins #2 and #4 of the TV-radio socket.
6. Add a 150K ohm resistor in series in the line running from pin #5 of the TV-radio socket to pin #6 of the 6C4 audio phase inverter.

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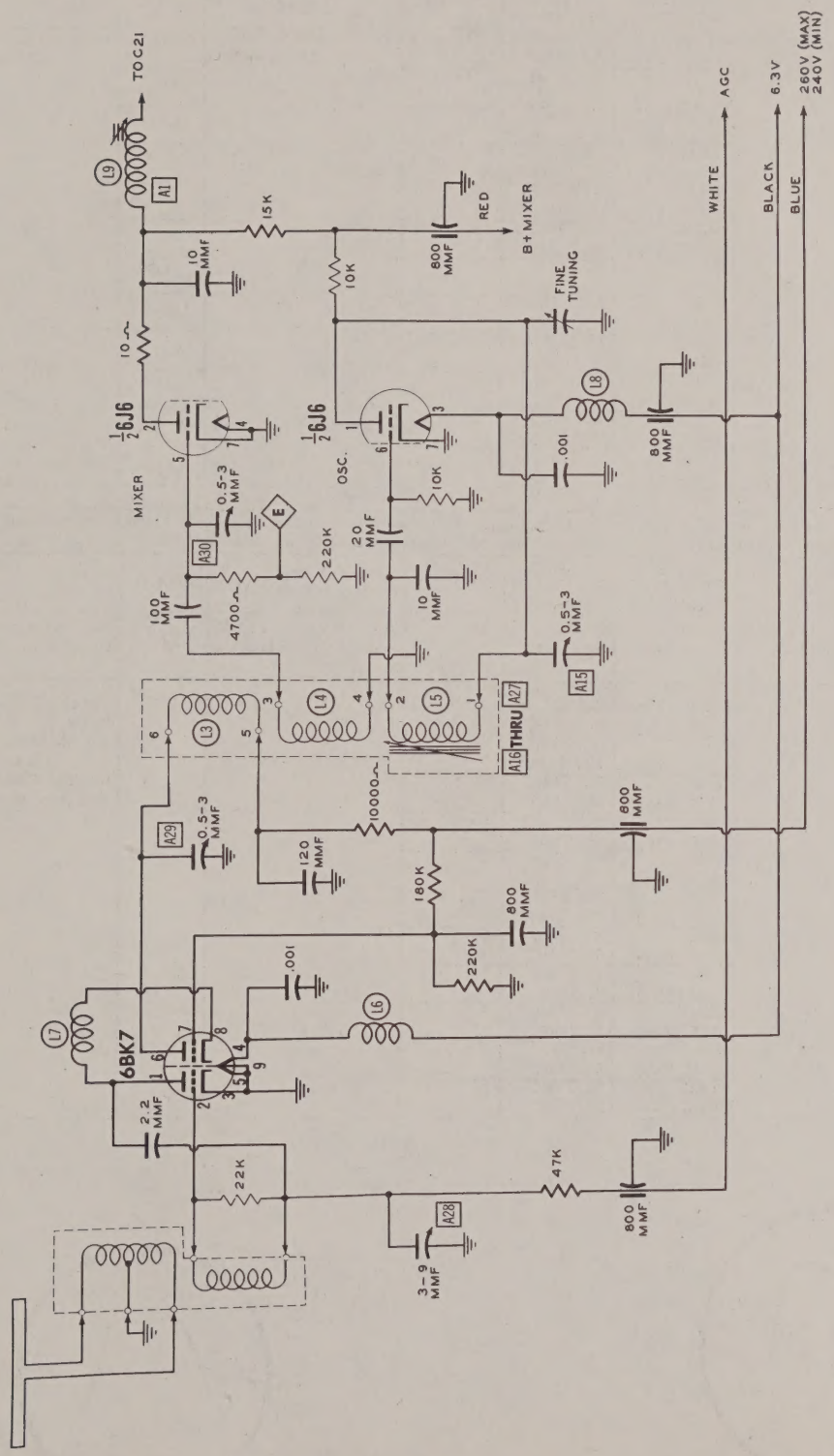
Truetone Model 2D1185E is similar to model 2D1185D except for the following changes:

A 17TP4 zero focus electrostatic type picture tube is used.

A Standard Coil Cascode Tuner with 6J6 and 6BK7 tube complement replaces the tuner of Model 2D1185D. A schematic of the tuner and alignment are shown below. For receiver alignment refer to Photofact Folder 13 Set 154.



(Continued on reverse side)

TRUETONE
MODEL 2D1185E

OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket. Complete oscillator alignment may not be necessary. If the oscillator seems to be off frequency approximately the same amount for a majority of the channels it may be possible to correct them in one step using A15. It should be noted that this is an all channel oscillator circuit adjustment and should not be used to correct for any individual channel. If adjustment of A15 will not bring all channels well with in the range of the fine tuning control it will be necessary to adjust the channel strip adjustment for each channel that is off frequency. The channel adjustment screws are reached through a hole just to the right of the channel switch shaft. The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
Two 120Ω Carbon Resistors	Across antenna Terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. amp. to point A . Low side to chassis.	A16	Adjust to place sound marker in notch as per fig.1. Video marker should be at 50%.
		207MC (10 MC Swp)	205.25MC 209.75MC	12		A17	
		201MC (10MC Swp)	199.25MC 203.75MC	11		A18	
		195MC (10MC Swp)	193.25MC 197.75MC	10		A19	
		189MC (10MC Swp)	187.25MC 191.75MC	9		A20	
		183MC (10MC Swp)	181.25MC 185.75MC	8		A21	
		177MC (10MC Swp)	175.25MC 179.75MC	7		A22	
		85MC (10MC Swp)	83.25MC 87.75MC	6		A23	
		79MC (10MC Swp)	77.25MC 81. 75MC	5		A24	
		69MC (10MC Swp)	67.25MC 71.75MC	4		A25	
		63MC (10MC Swp)	61.25MC 65.75MC	3		A26	
		57MC (10MC Swp)	55.25MC 59.75MC	2		A27	

RF ALIGNMENT

Connect the synchronized sweep voltage from the signal generator to the horizontal imput of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	207MC (10MC Swp)	205.25MC 209.75MC	12	Vert. amp. thru 10KΩ to point E . Low side to chassis.	A28, A29 A30	Adjust for response curve similar to fig. 5 with markers above 90%.
"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		Check all channels for response similar to fig.2 . If markers fall below 70% on any channel, make slight adjustments of A28, A29, and A30 with channel switch set for that channel. Recheck all channels to that they have not been seriously affected.
		201MC (10MC Swp)	199.25MC 203.75MC	11			
		195MC (10MC Swp)	193.25MC 197.75MC	10			
		189MC (10MC Swp)	187.25MC 191.75MC	9			
		183MC (10MC Swp)	181.25MC 185.75MC	8			
		177MC (10MC Swp)	175.25MC 179.75MC	7			
		85MC (10MC Swp)	87.25MC 87.75MC	6			
		79MC (10MC Swp)	77.25MC 81.75MC	5			
		69MC (10MC Swp)	67.25MC 71.75MC	4			
		63MC (10MC Swp)	61.25MC 65.75MC	3			
		57MC (10MC Swp)	55.25MC 59.75MC	2			

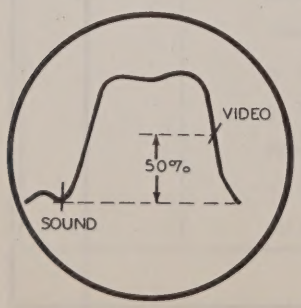


FIG.1

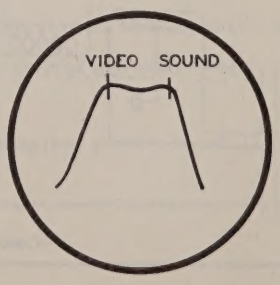


FIG.2

PHOTOFACT* Folder

*TRADE MARK

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CHASSIS 22A2, A, 22M1, 22Y1

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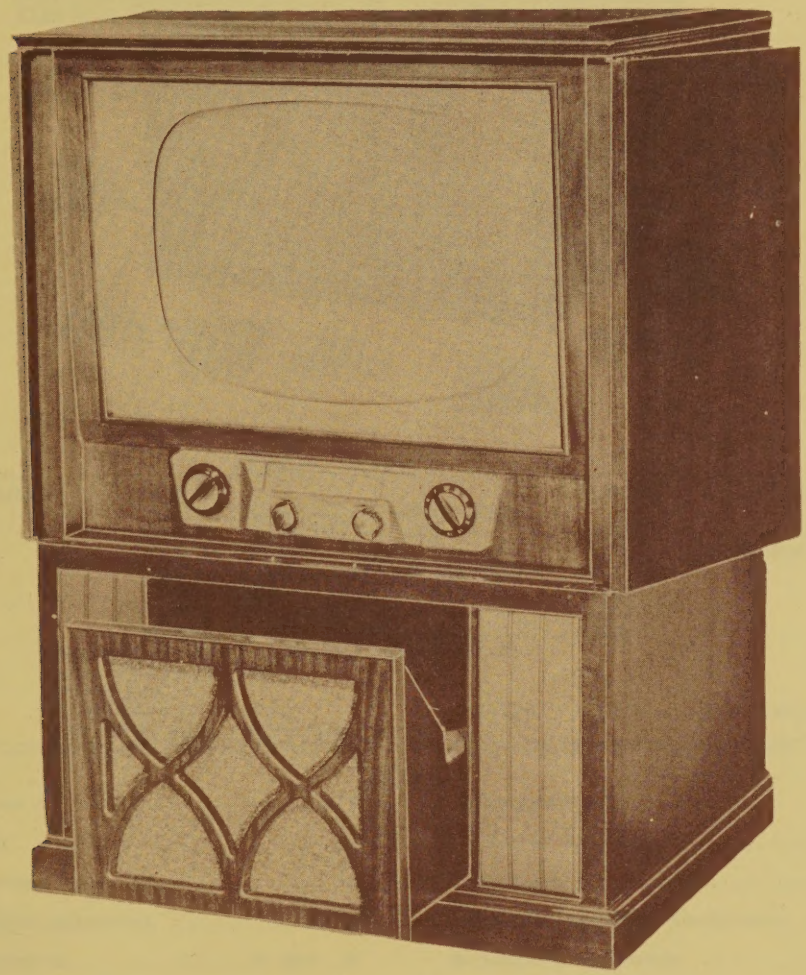
The contents for this envelope will be found among the last folders in this complete set of folders . . . *unless* it has been purchased as part of a *complete* volume of PHOTOFACTS assembled in a DeLuxe Binder.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.



MODEL 321M26A

ADMIRAL
CHASSIS 22A2, A, 22M1, 22Y1

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DATE 9-52 SET 180 FOLDER 2

ADMIRAL
CHASSIS 22A2, A, 22M1, 22Y1

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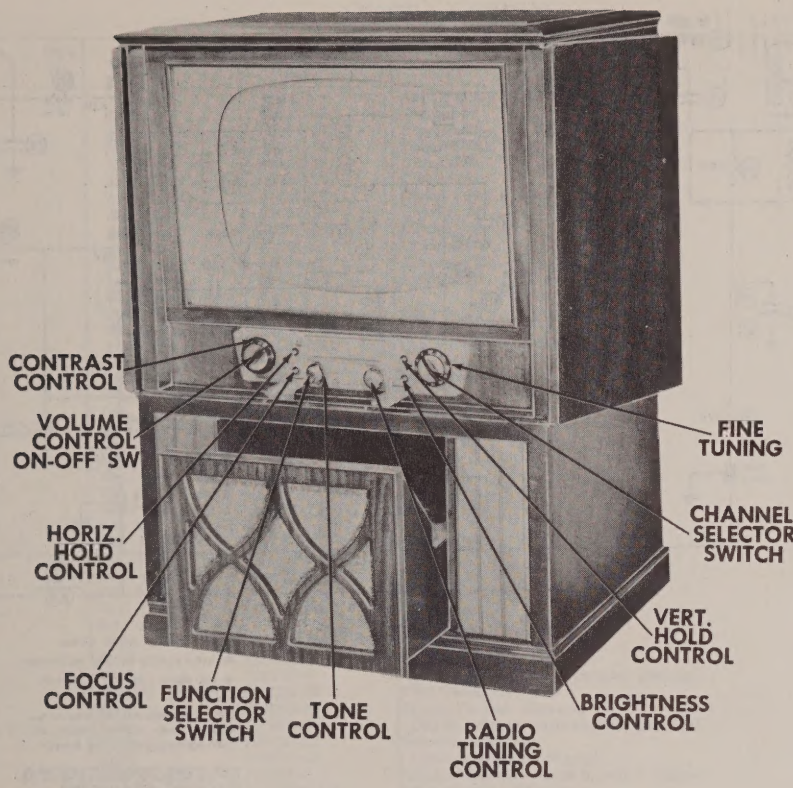

ADMIRAL 321M26A

TRADE NAME	Admiral	MODELS	CHASSIS	RECORD CHANGER
		211K15A, 121K16A, 121K17A, 121M10, 121M11A, 121M12A, 221K45A, 221K46A, 221K47A	22M1	
		321M25A, 321M26A, 321M27A	22Y1	RC550A or RC550GA
		421M15A, 421M16A, 421M35, 421M36, 421M37	22Y1	
		520M11, 520M12	22A2A	
		520M15, 520M16, 520M17	22A2	
		521M15A, 521M16A, 521M17A	22Y1	
MANUFACTURER		Admiral Corp. 3800 W. Cortland St., Chicago 47, Ill.		
TYPE SET		AM-TV-Phono Combination		
TUBES		Twenty-four		
POWER SUPPLY		110-120 Volts AC-60 Cycle	RATING	1.87 amp. @ 117 volts AC
TUNING RANGE		530-1620 KC (AM), Channels 2 thru 13 (TV)		

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ADMIRAL
CHASSIS 22A2, A, 22M1, 22Y1

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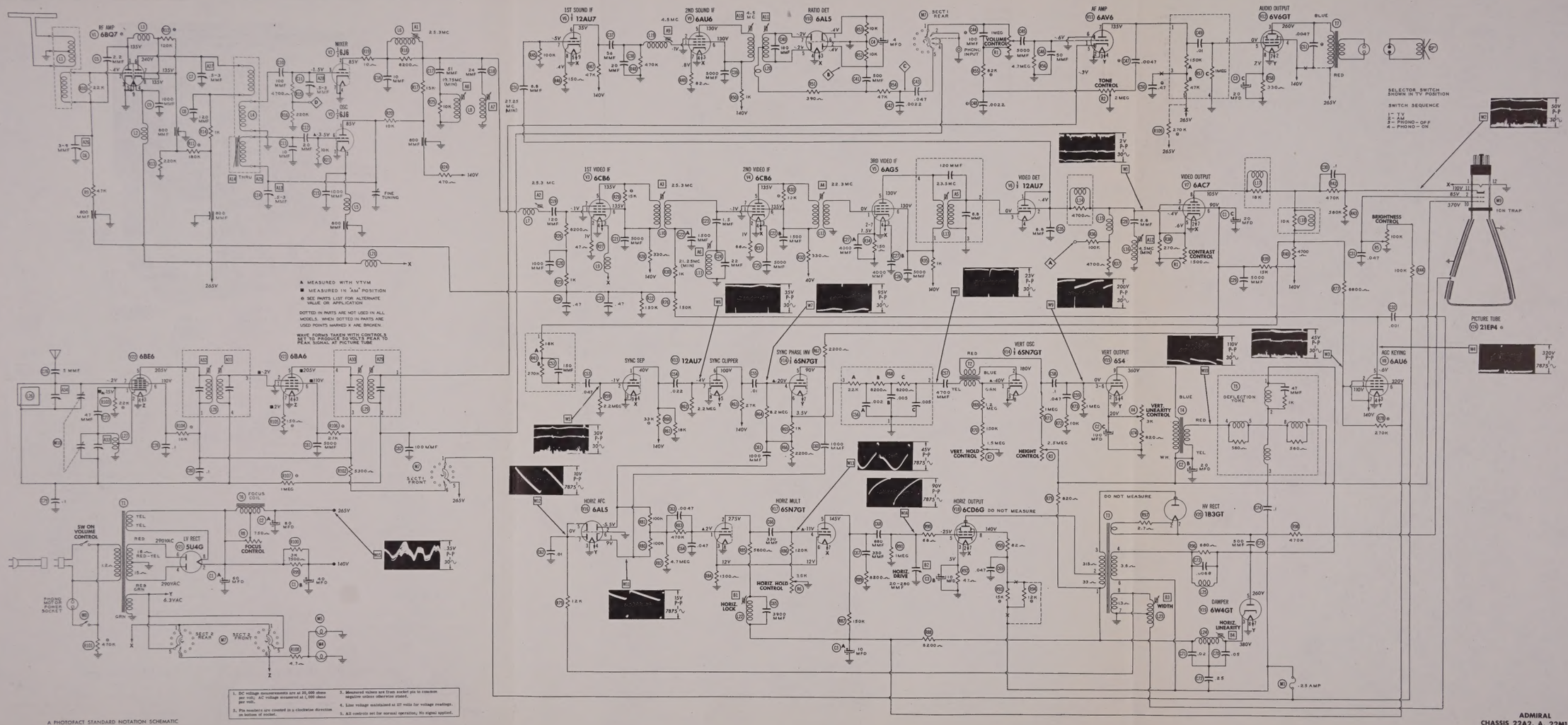
RF AMP V2 6BQ7
MIXER V3 6J6
OSC V4 6J6
1ST SOUND IF V8 12AU7
2ND SOUND IF V9 6AU6
RATIO DET V10 6AL5
SECT I REAR
AF AMP V11 6AV6
AUDIO OUTPUT V12 6V6GT
1ST VIDEO IF V1 6CB6
2ND VIDEO IF V4 6CB6
3RD VIDEO IF V5 6AG5
VIDEO DET V6 12AU7
VIDEO OUTPUT V7 6AC7
SYNC SEP V13 12AU7
SYNC CLIPPER
SYNC PHASE INV V14 6SN7GT
VERT OSC V14 6SN7GT
VERT OUTPUT V15 6S4
AGC KEYING V16 6AU6
HORIZ AFC V16 6AL5
HORIZ MULT V17 6SN7GT
HORIZ OUTPUT V18 6CD6G DO NOT MEASURE
HV RECT V19 1B3GT
DAMPER V13 6W4GT
PICTURE TUBE V14 21EP4
LV RECT V12 5U4G
SW ON VOLUME CONTROL
PHONO MOTOR POWER SOCKET
FOCUS COIL
FOCUS CONTROL
SECT 2 REAR
SECT 2 FRONT
SECT I FRONT
VOLUME CONTROL
TONE CONTROL
CONTRAST CONTROL
BRIGHTNESS CONTROL
ION TRAP
VERT. HOLD CONTROL
HEIGHT CONTROL
VERT. LINEARITY CONTROL
DEFLECTION YOKE
HORIZ. HOLD CONTROL
HORIZ. LOCK
HORIZ. DRIVE
HORIZ. LINEARITY
WIDTH
SELECTOR SWITCH SHOWN IN TV POSITION
SWITCH SEQUENCE
1 – TV
2 – AM
3 – PHONO – OF F
4 – PHONO – ON
▲ MEASURED WITH VTVM
■ MEASURED IN "AM" POSITION
● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DOTTED IN PARTS ARE NOT USED IN ALL MODELS. WHEN DOTTED IN PARTS ARE USED POINTS MARKED X ARE BROKEN.
WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK TO PEAK SIGNAL AT PICTURE TUBE
1. DC voltage measurements are at 20,000 ohms per volt; AC voltage measured at 1,000 ohms per volt.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation, No signal applied.
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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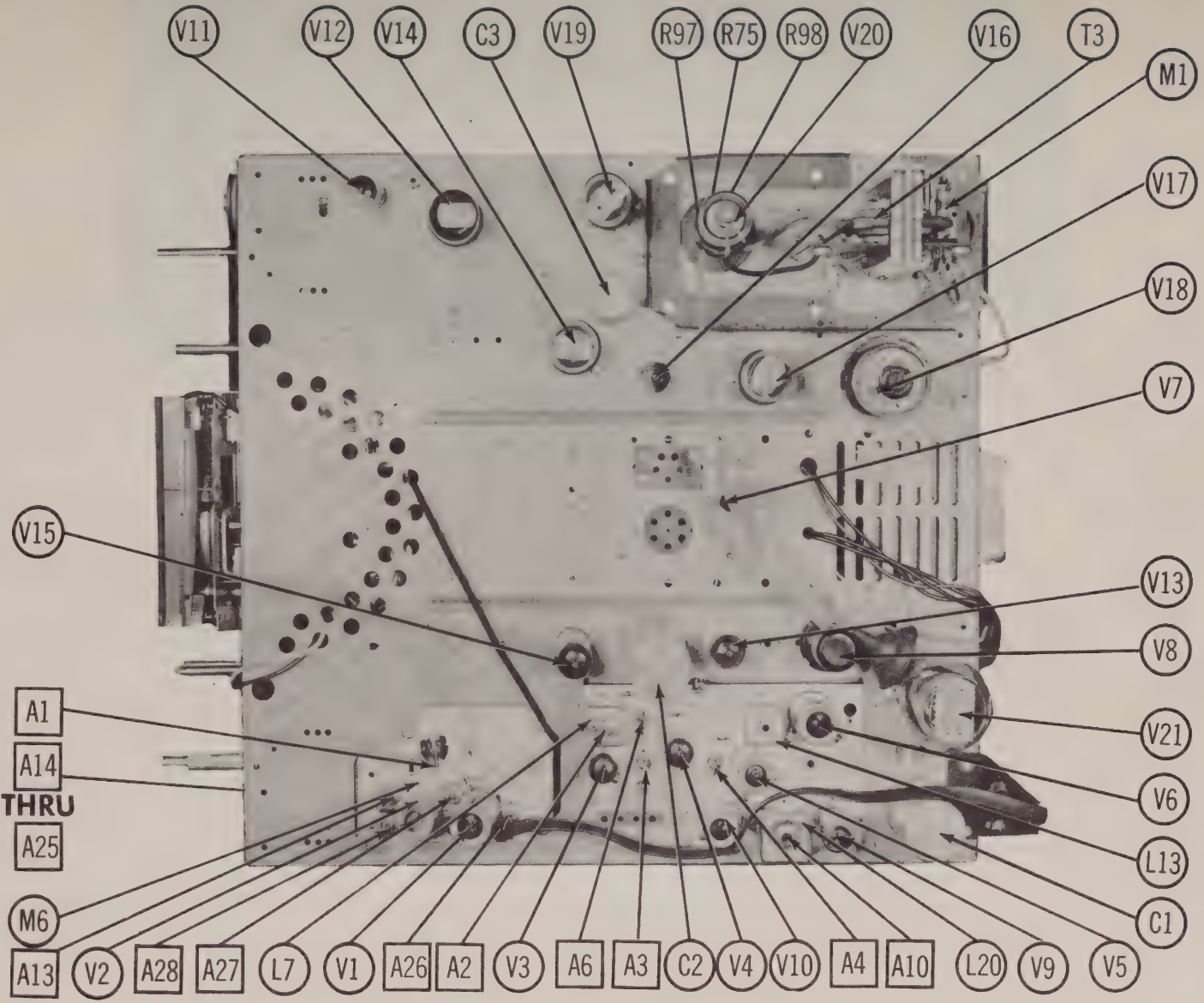
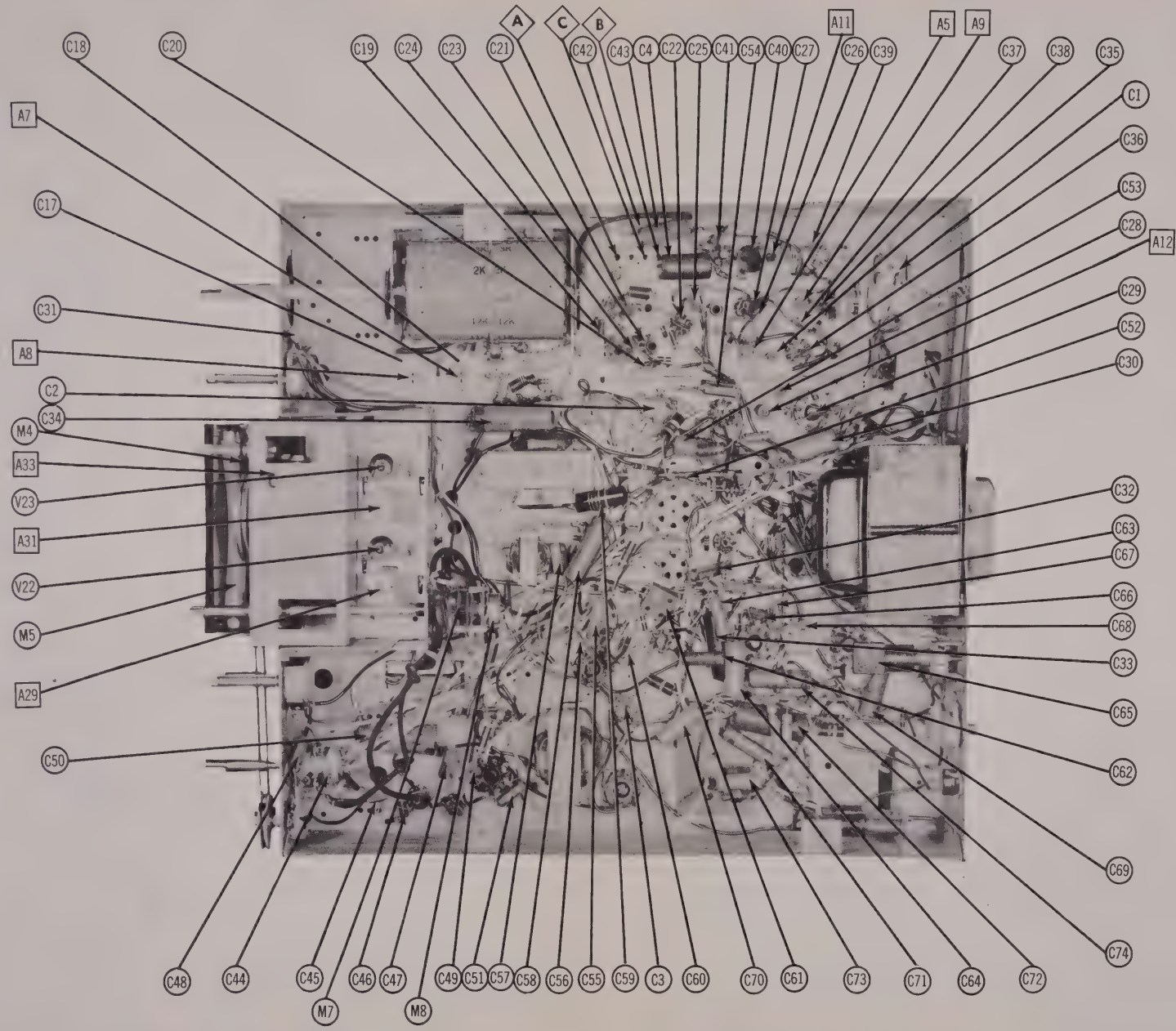
ADMIRAL
CHASSIS 22A2, A, 22M1, 22Y1

ADMIRAL
CHASSIS 22A2, A, 22M1, 22Y1



CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

TUBE PLACEMENT CHART

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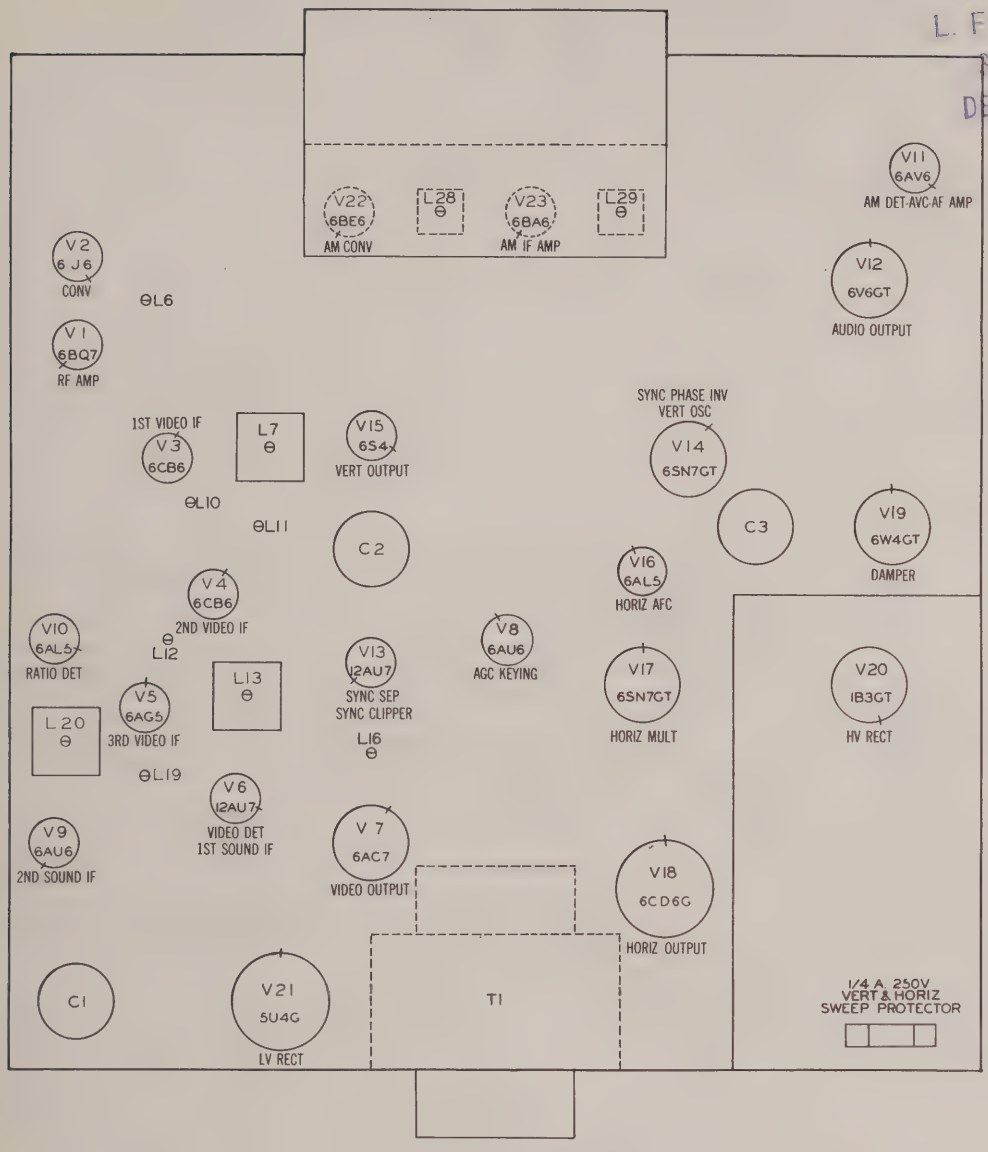


TOP VIEW

TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound-V21

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster-V2, V3, V4, V5, V6
No pic, no sound, has snow-V1, V2, V3
No pic, has sound has raster-V7, V24
Has pic, no sound-V6, V9, V10, V11, V12

SYNC FAILURE
No vert. sync. -V14
No horiz. sync. -V14, V16, V17
No vert or horiz. sync. -V13, V14

SWEEP FAILURE
No raster, has sound-V17, V18. V19, V20, V24, Fuse (M1)
No vertical deflection -V15
Poor vert. linearity or foldover-V14, V15
Poor horiz. linearity or foldover -V17, V18, V19
Narrow picture-V17, V18, V19, V20, V21
Vert off freq. -V14
Horiz. off freq. -V14, V16, V17

TV ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from the chassis. Do not remove the horizontal oscillator tube to disable the high voltage.

VIDEO IF ALIGNMENT

Remove the converter tube, V2, from its socket and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications.
Connect the negative lead of a 3 volt battery to the ungrounded side of C33. Connect the positive lead to chassis.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube V2 . Low side to chassis.	25.3MC (Unmod)	Any	DC probe to point ◇A◇ Common to chassis.	A1, A2, A3	Adjust for maximum deflection.
2.	"	"	22.3MC	"	"	A4	"
3.	"	"	23.5MC	"	"	A5	"
4.	"	"	21.25MC	"	"	A6	Adjust for minimum deflection.
5.	.001MFD	High side to point ◇D◇ Low side to chassis.	27.25MC	"	"	A7	Use 1½ volt bias battery. Adjust for minimum deflection
6.	"	"	19.75MC	"	"	A8	"
7.	Direct	High side to an ungrounded tube shield floating over dummy converter tube, V2. Low side to chassis.	25.3MC	"	"	A1, A2	Adjust for maximum deflection.

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Direct	High side to an ungrounded tube shield floating over dummy converter tube V2. Low side to chassis.	24MC (10MC Swp)	21.25MC 22.MC 24.3MC 25.MC 25.75MC	Any	Vert. amp. to point ◇A◇ . Low side to chassis.		Check for response curve as per fig. if . If necessary readjust A1 thru A5 slightly for desired response.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
9.	.01MFD	High side to pin 2 (grid) of 12AU7 (V6). Low side to chassis.	4.5MC (Unmod)	Any	DC probe to point ◇B◇ Common to chassis.	A9, A10	Adjust for maximum deflection.
10.	"	"	"	"	DC probe to point ◇C◇ Common to chassis.	A11	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	.01MFD	High side to pin 2 (grid) of 12AU7 (V6). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. amp. to point ◇B◇. Low side to chassis.	A9, A10	Disconnect stabilizer capacitor C4. Adjust for curve of maximum amplitude and symmetry as per fig. 2.
10.	"	"	"	"	"	Vert. amp. to point ◇C◇. Low side to chassis.	A11	Reconnect capacitor C4. Adjust so that 4.5MC occurs at center of crossover lines as per fig. 3. SLIGHTLY retouch A10 for maximum amplitude and straightness of crossover lines.

4.5MC TRAP ALIGNMENT

Connect a 10MMF capacitor from pin 8 of V8 to pin 8 of V6.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
11.	.01MFD	High side to pin 2 (grid) of 12AU7 (V6) Low side to chassis.	4.5MC (Unmod)	Any	DC probe to point ◇B◇ Common to chassis	A12	Adjust for MINIMUM deflection

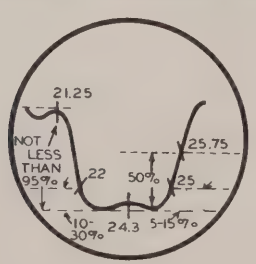


FIG. 1

FIG. 2

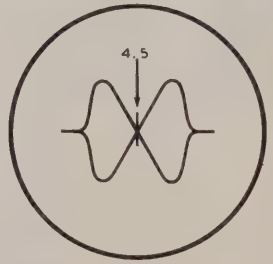


FIG. 3

TV ALIGNMENT INSTRUCTIONS (CONT.)

OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket.
Complete oscillator alignment may not be necessary. If the oscillator seems to be off frequency approximatley the same amount for the majority of the channels it may be possible to correct them in one step using A13.
It should be noted that this is an all channel oscillator circuit adjustment and should not be used to correct for any individual channel.
If adjustment of A13 will not bring all channels well within the range of the fine tuning control it will be necessary to adjust the channel strip adjustment for each channel that is off frequency.
The channel adjustment screws are reached through a hole just to the right of the channel switch shaft. The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
12.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. amp. to point ◇A◇. Low side to chassis.	A14	Adjust to place sound marker in notch as per fig. 4. Video marker should be at 50%.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A15	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A16	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A17	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A18	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A19	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A20	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A21	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A22	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A23	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A24	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A25	

RF AND MIXER ALIGNMENT

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
13.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	207MC (10MC Swp)	205.25MC 209.75MC	12	Vert. amp. thru 10KΩ to point ◇D◇. Common to chassis.	A26, A27 A28	Adjust for curve as shown in fig. 5 with markers above 90%.
14.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		Check for response curve as in fig. 5. If markers fall below 70% on any channel make compromise adjustments of A26, A27 and A28 with channel switch set for that channel. Recheck all other channels to see that they have not been seriously affected.
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

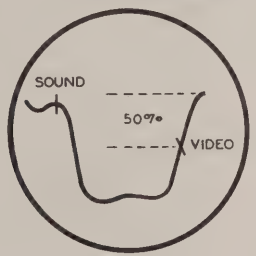


FIG. 4

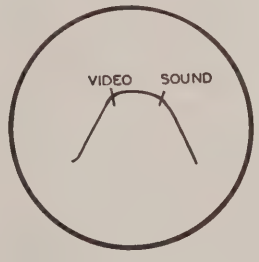


FIG. 5

RADIO ALIGNMENT INSTRUCTIONS

RADIO ALIGNMENT

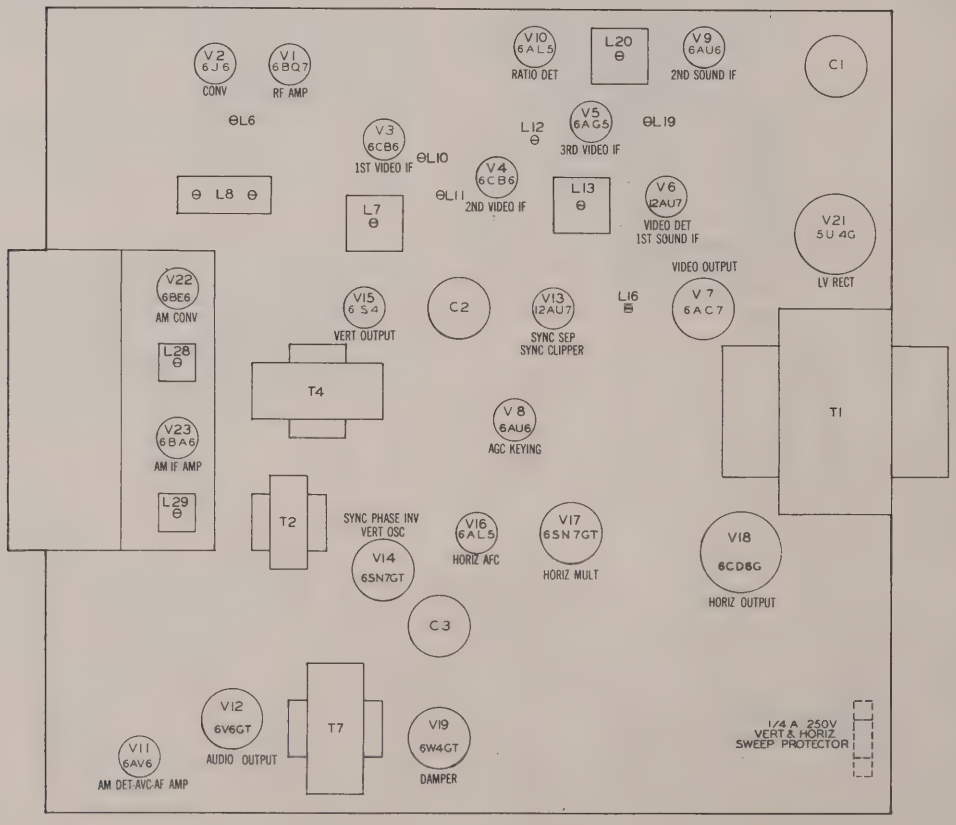
Turn tone control fully clockwise.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.
Use an insulated screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
15.	.1 MFD	High side to stator of antenna section of tuning gang. Low side to chassis.	455KC (400∿Mod.)	Radio	Tuning gang fully open	Across voice coil	A29, A30 A31, A32	Adjust for maximum output.
16.	"	"	1620KC	"	"	"	A33	"
17.		Loop	1400KC	"	Tune to 1400KC signal	"	A34	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

RESISTANCE MEASUREMENTS

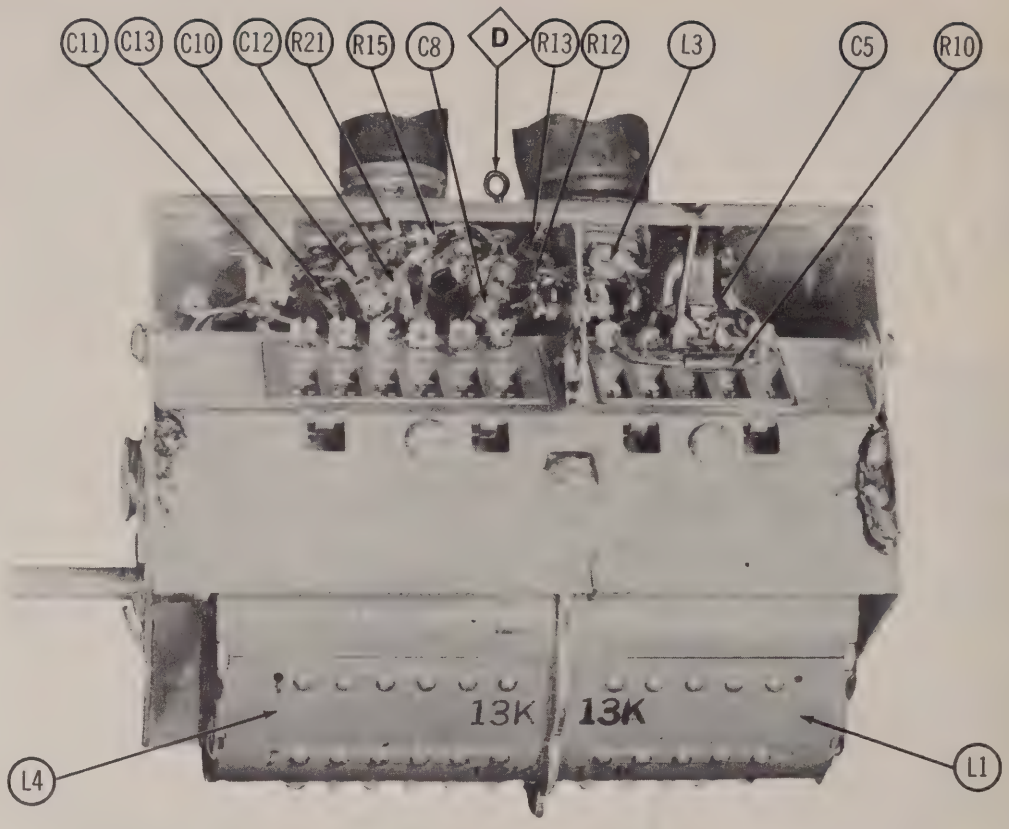
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BQ7	†250K	200KΩ	0Ω	.1Ω	0Ω	†1.3KΩ	†130KΩ	†250KΩ	0Ω
V 2	6J6	†13KΩ	†18KΩ	.1Ω	0Ω	220KΩ	10KΩ	0Ω		
V 3	6CB6	160KΩ	47Ω	.1Ω	0Ω	†2.4KΩ	†2.4KΩ	0Ω		
V 4	6CB6	150KΩ	68Ω	.1Ω	0Ω	†2.4KΩ	†2.4KΩ	0Ω		
V 5	6AG5	.6Ω	150Ω	.1Ω	0Ω	†3.1KΩ	†3.1KΩ	150Ω		
V 6	12AU7	4.7KΩ	4.7KΩ	.4Ω	0Ω	0Ω	†49KΩ	100KΩ	150Ω	.1Ω
V 7	6AC7	0Ω	0Ω	70Ω	4.7KΩ	70Ω	†17KΩ	.1Ω	†6.8KΩ	
V 8	6AU6	†13KΩ	†2.1KΩ	.1Ω	0Ω	300KΩ	#8.2KΩ	†2.1KΩ		
V 9	6AU6	470KΩ	0Ω	.1Ω	0Ω	†3.1KΩ	†3.1KΩ	82Ω		
V 10	6AL5	10KΩ	10KΩ	.1Ω	0Ω	INF	0Ω	INF		
V 11	6AV6	4.7Meg	0Ω	0Ω	.1Ω	■1 Meg	0Ω	†200KΩ		
V 12	6V6GT	INF	.1Ω	†525Ω	†2.1KΩ	1 Meg	†47KΩ	0Ω	330Ω	
V 13	12AU7	13KΩ	2.2Meg	0Ω	.1Ω	.1Ω	†29KΩ	2.2Meg	0Ω	0Ω
V 14	6SN7GT	2Meg	#1.5Meg	0Ω	8.2Meg	†19KΩ	3.2KΩ	.1Ω	0Ω	
V 15	6S4	INF	2.3KΩ	1Meg	.1Ω	0Ω	1 Meg.	INF	INF	#1.9KΩ
V 16	6AL5	4.8Meg	4.8Meg	0Ω	.1Ω	12KΩ	0Ω	12KΩ		
V 17	6SN7GT	5.1Meg	#14KΩ	1.5KΩ	130KΩ	#160KΩ	1.5KΩ	.1Ω	0Ω	
V 18	6CD6G	1 Meg	0Ω	47Ω	INF	1 Meg	#14KΩ	.1Ω	†6.8KΩ	Top Cap #45Ω
V 19	6W4GT	INF	INF	190KΩ	INF	†250Ω	INF	.1Ω	0Ω	
V 20	1B3GT	PINS 1-8 HAVE INF RESISTANCE								Top Cap #360Ω
V 21	5U4G	INF	30KΩ	INF	15Ω	INF	16Ω	INF	30KΩ	
V 22	6BE6	22KΩ	.1Ω	■.1Ω	0Ω	■†5.5KΩ	■†5.5KΩ	■2Meg.		
V 23	6BA6	■2Meg.	0Ω	■.1Ω	0Ω	■†5.5KΩ	■†32KΩ	150Ω		
V 24	21EP4A	.1Ω	60KΩ	Pin 10 #820Ω	Pin 11 275KΩ	Pin 12 0Ω				

ALL CONTROLS SET FOR NORMAL OPERATION, NO SIGNAL APPLIED.
ALL MEASUREMENTS TAKEN IN T.V. POSITION UNLESS NOTED.
† MEASURED FROM PIN 2 OF V21.
# MEASURED FORM PIN 3 of V19.
■ MEASURED IN AM RADIO POSITION.

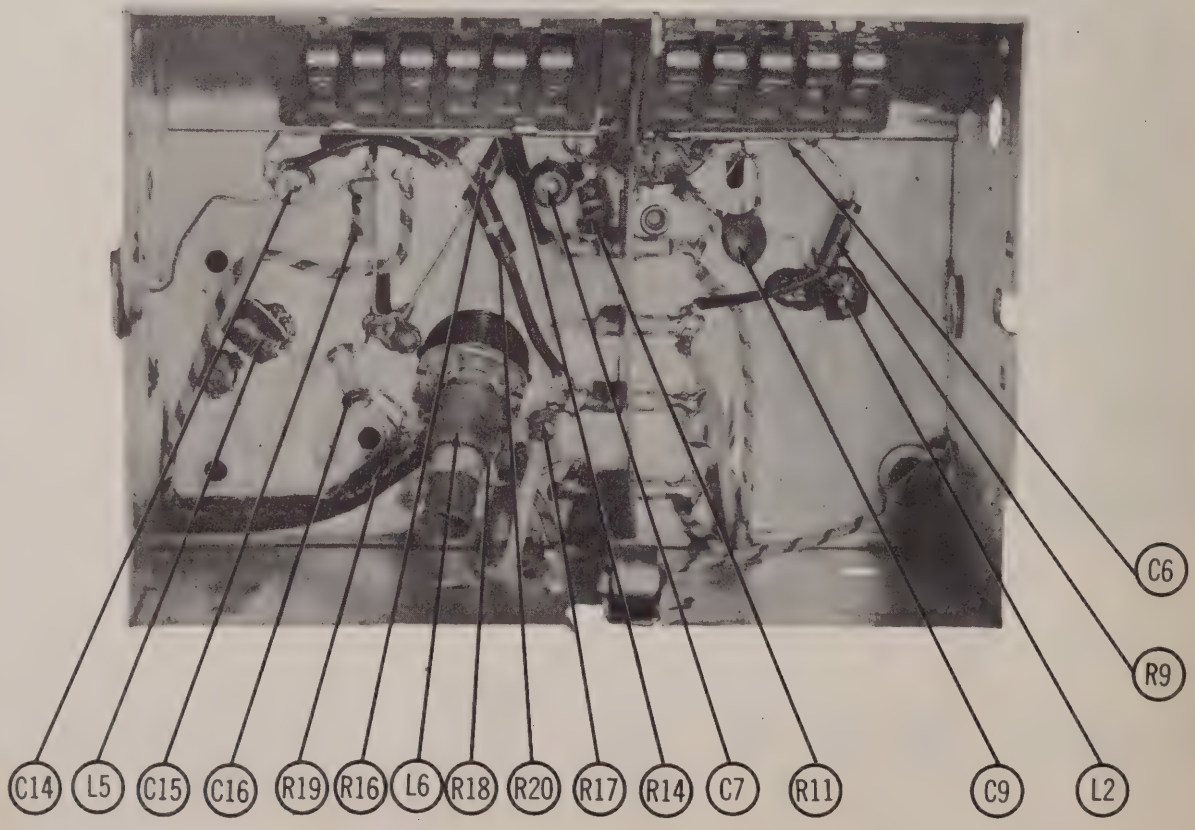


BOTTOM VIEW

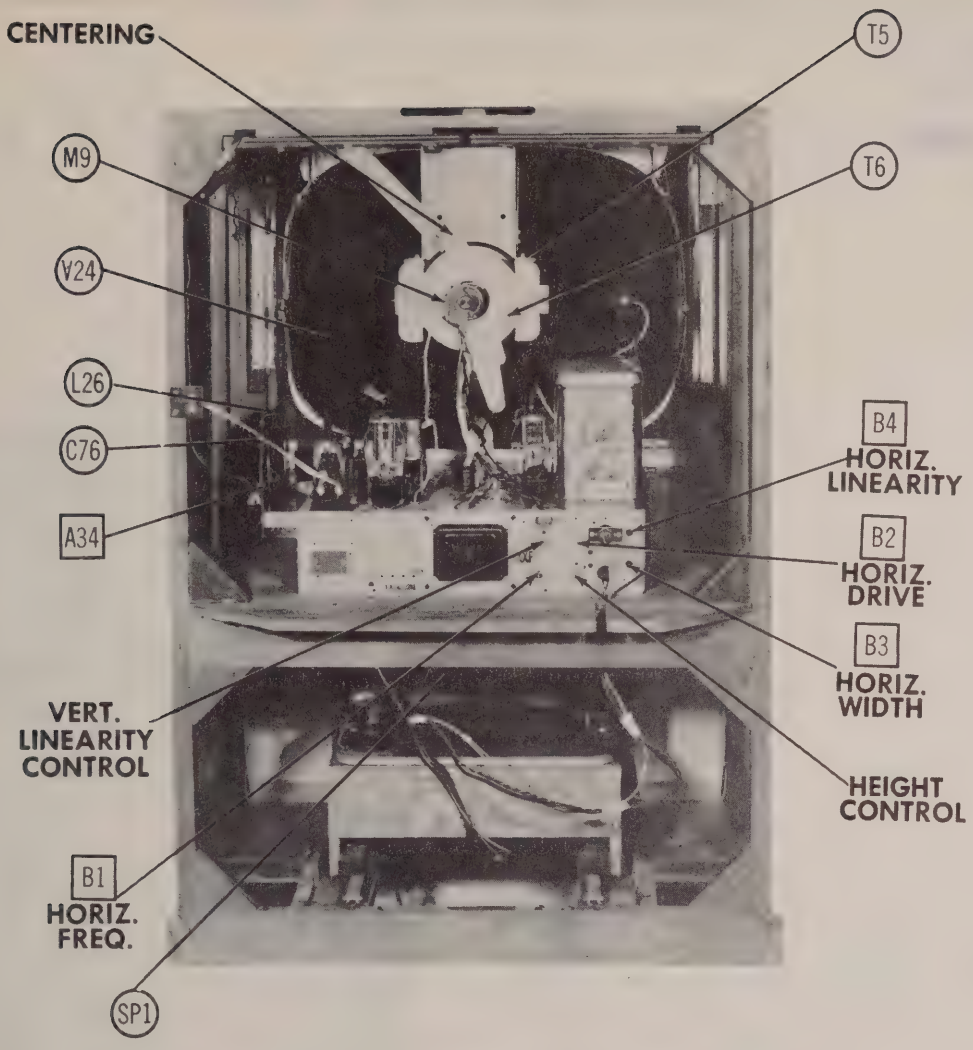
TUBE PLACEMENT CHART



RF TUNER-RIGHT SIDE



RF TUNER-BOTTOM VIEW



CABINET-REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Set the horizontal hold control at the mid-position of its range.

Adjust the horizontal lock slug (B1) until the picture synchronizes horizontally.

Adjust the horizontal drive trimmer (B2) to its maximum counter clockwise position without a vertical white line or compression of the center of the picture.

Adjust the width control slug (B3) for a picture slightly wider than enough to fill the picture mask.

Adjust the horizontal linearity slug (B4) for a picture that is symmetrical from left to right.

DISASSEMBLY INSTRUCTIONS

1. Remove 7 push on type control knobs from front panel.

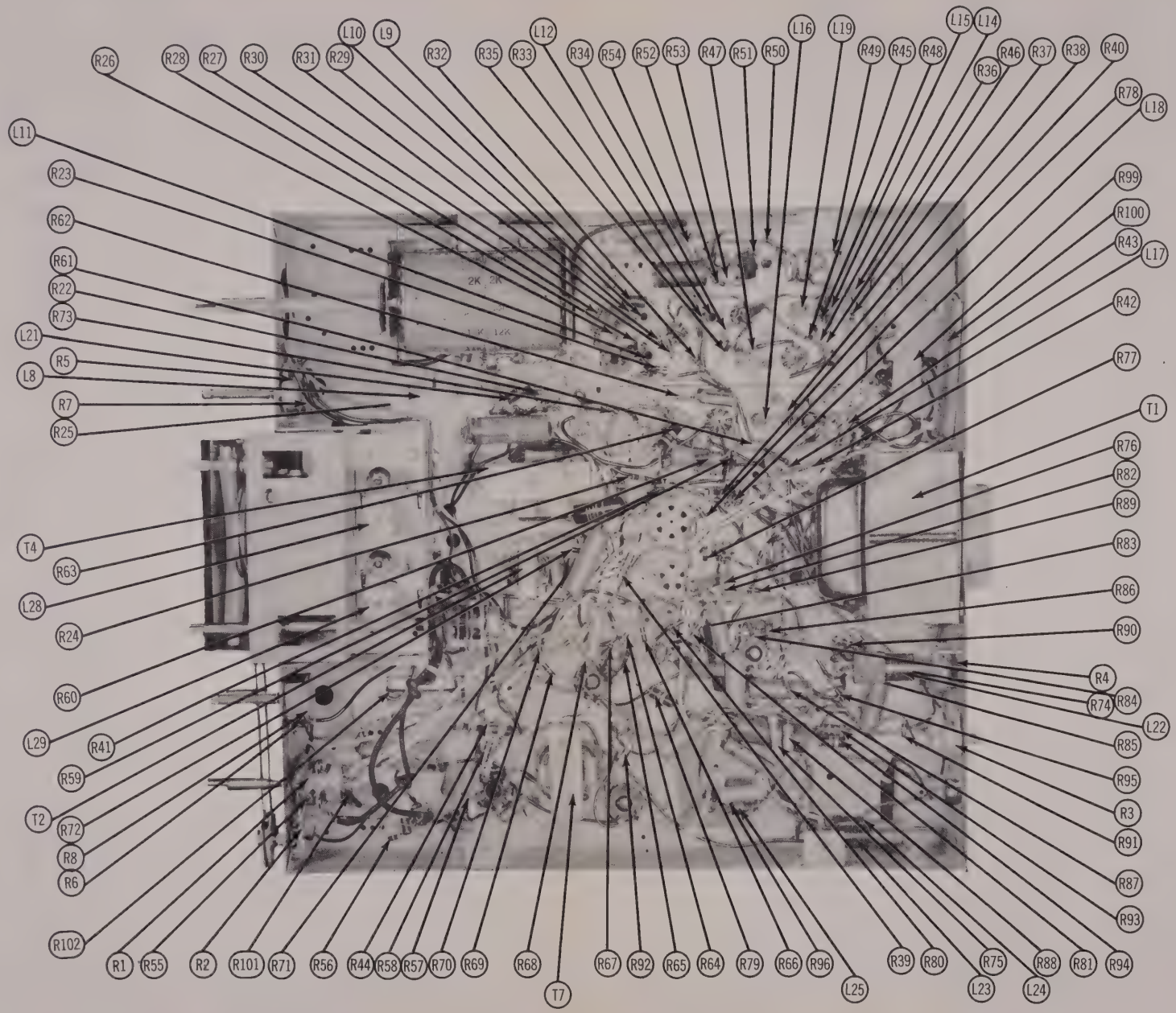
2. Remove 6 wood screws and 2 staples. Remove rear cover.

3. Disconnect built-in antenna, antenna lead from bracket, speaker, phono motor, audio cable, HV lead, ground strap from HV cage, focus plug, deflection plug and CRT socket.

4. Remove 4 chassis bolts. Remove chassis.

5. For speaker removal, remove 4 wood screws. Remove top panel in front of record changer. Remove 4 speed nuts. Remove speaker.

NOTE: FOR PICTURE TUBE REMOVAL IT IS NECESSARY TO REMOVE CHASSIS AS OUTLINED ABOVE.



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: ADMIRAL PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V1A	RF Amplifier	6BQ7	6BQ7	9AJ	If tubes are interchanged tuner must be realigned.
B	RF Amplifier	6BK7	6BK7	9AJ	
V2	Converter	6J6	6J6	7BF	
V3	1st. Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd. Video IF Amp.	6AG5	6AG5	7BD	
V6	Video Detector - 1st. Sound IF Amp.	12AU7	12AU7	9A	
V7	Video Output	6AC7	6AC7	8N	
V8	AGC Keying	6AU6	6AU6	7BK	
V9	2nd. Sound IF Amp.	6AU6	6AU6	7BK	
V10	Ratio Detector	6AL5	6AL5	6BT	
V11	AM Det. - AVC AF Amplifier	6AV6	6AV6	7BT	
V12	Audio Output	6V6GT	6V6GT	7AC	
V13	Sync Separator - Sync Clipper	12AU7	12AU7	9A	
V14	Sync Phase Inv. - Vert. Oscillator	6SN7GT	6SN7GT	8BD	
V15	Vert. Output	6S4	6S4	9AC	
V16	Horiz. AFC	6AL5	6AL5	6BT	
V17	Horiz. Mult.	6SN7GT	6SN7GT	8BD	
V18	Horiz. Output	6CD6G	6CD6G	5BT	
V19	Damper	6W4GT	6W4GT	4CG	
V20	HV Rectifier	1B3GT	1B3GT	3C	
V21	LV Rectifier	5U4G	5U4G	5T	
V22	Converter	6BE6	6BE6	7CH	
V23	IF Amplifier	6BA6	6BA6	7BK	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: ADMIRAL PART No.	REPLACEMENT DATA: SYLVANIA PART No.		RTMA BASE TYPE	NOTES
V24A	21EP4A	21EP4A		12D	① Circuit changes necessary
		21EP4 ①		12D	
		21FP4 ①		12C	
		21FP4A ①		12C	
B	20CP4	20CP4		12D	
C	20DP4			12D	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: ADMIRAL PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	▲60	400	67C15-21	AFH3-46		UPT6245		FP378	TVL-2770	
B	■40	350				BR4035			TVA-1608	
C	▲20	350								
C2A	■80	350	67C15-18	AFH3-182		UPT317		FP235	TVL-3722	
B	▲20	450						TC3501		
C	▲100	50								
C3A	■10	450	67C15-19	AFH3-125		UP1145C		FP345.2	TVL-3719	
B	10	25								
C	▲20	25								
C4	4	50	67A4-9	PRS150/4		BR550		TC30	TVA-1303	
C5	2.2		94C37-97		TCZ-2.2		NP0K-2R2		5TCCB-V22	
C6	3-9		98A45-96		829-10					
C7	.5-3		98A45-23		829-3			CT565A		
C8	120			SI120	D6-121	TM5T12	GP2K-121	UC-5312	5GA-T12	
C9	1000		98A45-24	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C10	100		98A45-26	SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C11	.5-3		98A45-23		829-3			CT565A		
C12	20		98A45-27	SI20NP0	TCZ-20		NP0K-200	ZT-542	5TCC-Q2	
C13	10		98A45-79	SI10N750	TCN-10		N750K-100	NT-541	5TCU-Q1	
C14	.5-3		98A45-23		829-3			CT565A		
C15	1000		65C6-41	SI1000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C16	10		98A45-64	SI10NP0	TCZ-10		NP0K-100	ZT-541	5TCC-Q1	
C17	51		94D45-52							
C18	24		94D45-53							
C19	120		65B1-10	SI120	D6-121	TM5T12	GP2K-121	UC-5312	5GA-T12	
C20	1000		65C6-41	SI1000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C21	5000		65C10-1	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C22A	1500		65A17-2	BPD-2X0015	DD-2-152	TM5DD15	812-0015	DCD-525	5HK-2D15	
B	1500									
C23	1.5		65C6-85	SI1.5NP0	TCZ-1.5		NP0K-1R5	ZT-5515	5TCCB-V15	
C24	22		65C6-47		TCZ-22		NP0K-220		5TCC-Q22	
C25	5000		65C10-1	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C26	5000		65C6-10	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C27A	4000		65A17-1	BPD-2X004	D6-402	TM5DD4		DCD-524	5HK-2D4	
B	4000				D6-402					
C28	6.8		65C6-71							
C29	5000		65C10-1	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C30	.1	400	64B5-20	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C31	.047	400	64B9-28	P488-047	DF-503	PTE4S47		PT4147	4TM-S47	
C32	.001	600	64B9-19	P688-001	D6-102	PTE6D1	GP2L-102	PT621	6TM-D1	
C33	.47	200	64A10-1	P288-47		PJ2P5		PT405	2TM-P47	
C34	.47	200	64A10-1	P288-47		PJ2P5		PT405	2TM-P47	
C35	6.8		65C6-71							
C36	6.8		65C6-71							
C37	56		65C6-34		TCN-56					
C38	20		65C6-51	SI20NP0	TCZ-20		NP0K-200	ZT-542	5TCC-Q2	
C39	5000		65C10-1	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C40	180		65C6-59		TCN-180		N750L-181			
C41	500		65C6-6	SI500	D6-501	TM5T5	GP2K-501	UC-535	5GA-T5	
C42	.0022	400	64B9-17	P688-0022	D6-222	PTE6D22	GP2-333-222	PT6222	6TM-D22	
C43	.047	400	64B9-41	P488-047	DF-503	PTE4S47		PT4147	4TM-S47	
C44	100		65C6-3	SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	Note 1
C45	5000		65C10-1	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (CONT.)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA ADMIRAL PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C46	50		65C6-4	SI50	D6-500	TM5Q5	GP1K-500	UC-545	5GA-Q5	
C47	.0047	600	64B9-12	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	Note 1
C48	.0022	600	64B9-14	P688-0022	D6-322	PTE6D32	GP2-333-322	PT6322	6TM-D22	Note 1
C49	.01		†63B6-3	P688-01	†PC-177	PTE6S1	GP2-333-103	PT611	6TM-S1	
C50	.47	400		484-5		PJ4P5		PT405	4TM-P5	Note 1
C51	.0047	600	64B5-12	P688-3047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	Note 2
C52	.150		† 63B6-4	SI150	†PC-178	TM5T15	GP2K-151	UC-5315	5GA-T15	
C53	.047	600	64B9-28	P688-047	DF-503	PTE6S47		PT6147	6TM-S47	
C54	.022	400	64B5-24	P488-022	DF-203	PTE4S22		PT4122	4TM-S22	
C55	.01	400	64B5-25	P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C56A	.002			P688-002		P TE6D2		PT622		
B	.005		†63B6-2	P688-005	†PC-100	PTE6D5	†1405-01	PT625	†101C1	
C	.005			P688-005		PTE6D5		PT625		
C57	4700	500	65B21-472	1464-005		IDR5D5		MCB465	MS-25	
C58	.1	600	64B5-5	P688-1	DF-104	PTE6P1		PT601	6TM-P1	
C59	.047	600	64B8-9	P688-047	DF-503	PTE6S47		PT6147	6TM-S47	
C60	1000	500	65B21-102	1468-001	D6-102	1W5D1	GP2L-102	MC255	1FM-Z1	
C61	1000	500	65B21-102	1468-001	D6-102	1W5D1	GP2L-102	MC255	1FM-Z1	
C62	.01	400	64B5-25	P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C63	.0047	600	64B5-12	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	
C64	.047	400	64B9-28	P488-047	DF-503	PTE4S47		PT4147	4TM-S47	
C65	3900	500	65B1-63	1464-004		IDR5D4		MCB463	MS-24	
C66	330	500	65B21-331	1469-00035						
C67	330	500	65B21-331	1469-00035						
C68	680	500	65B21-681	1479-0007		2R5T7			MS-37	
C69	.047	600	64B8-9	P688-047	DF-503	PTE6S47		PT6147	6TM-S47	
C70	.05	200	64A2-8	P288-05		PJ2S5		PT415	2TM-S5	
C71	.02	400	64B5-22	P488-02		PTE4S2		PT412	4TM-S2	
C72	.25	600	64B5-3	684-25		PTE6P25		PT6025	6TM-P25	
C73	.0068	600	64A2-15	P688-0068	D6-682	PTE6D68	GP2-333-682		6TM-D68	
C74	.1	600	64A2-10	P688-1	DF-104	PTE6P1		PT601	6TM-P1	
C75	500	20000	HV20C	HV5C	MM-C20TS	413-501			20DK-T5	
C76	5	500	65B1-62	1468-000005	TCZ-4.7	5W5Y5	GP1K-050	MC205	MS-55	
C77	47		65C6-4	SI47	D6-470	TM5Q5	GP1K-470	UC-5447	5GA-Q47	
C78	.1	400	64B5-20	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C79	.1	200	64B5-30	P288-1	DF-104	PJ2P1		PT401	2TM-P1	
C80	.1	400	64B5-20	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C81	5000		65C10-1	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C82	100		65C6-3	SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	

Note 1. Not used in Chassis 22M1.
Note 2. Chassis 22M1 uses .01MFD
† Items C49, R57A, R57B, R57C are combined in one unit. Chassis 22M1 may use part #63B6-5
† Items C52, R41A, R41B are combined in one unit.
♦ Items C56A, C56B, C56C, R68A, R68B, R68C are combined in one unit

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA ADMIRAL PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1500Ω	½	75B11-20	QJ-330 *	RTV-327	SBBT-709-S	UF152R	Contrast-Panel
B	1 Meg	½					UR16-T35	Volume-Tapped ⓐ 330KΩ-Rear
C	Switch						US-26	Attach to R1B
R2A	2 Meg	½	75B1-50	PQ11-139	AG-83-S	AB-75	U-56	Tone
B	Shaft		Not Req.	Not Req.	RS-2	AK-8	Not Req.	Attach to R2A
R3A	2.5Meg	½	75B13-3	Q11-339	AG-84-S	AB-83	SU-565	Height
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R3A
R4A	3000Ω	½	75B13-7	Q11-113	AG-15-S	AB-8	SU-14	Vert Linearity
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R4A
R5A	100KΩ	½	75B13-12	Q11-128	AG-49-S	AB-40	U-41	Brightness
B	Shaft		Not Req.	Not Req.	KSS-3	AK-1	Not Req.	Attach to R5A
R6A	25KΩ	½	75B13-13	Q11-120	AG-40-S	AB-28	U-29	Horiz. Hold
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R6A
R7A	1.5Meg	½	75B13-14	Q11-137	AG-61-S	AB-69	U-54	Vert Hold
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R7A
R8A	750Ω	2	75B13-16	WX-750L	A43-750			Focus-Wire Wound
B	Shaft		Not Req.	NOt Req.	KSS-3			Attach to R8A

CONCENTRIKIT EQUIVALENT-KIT K-2, BASE ELEMENTS & SHAFTS B17-110 & R1-126 (panel)
B10-137X & R2-212 (rear) & SWITCH 76-1.

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA ADMIRAL PART No.	IRC PART No.	NOTES
R9	47KΩ	½	98A45-17	BTS-47K	
R10	22KΩ	½	94C37-85	BTS-22K	
R11	180KΩ-5%	½			Note 1
R12	120KΩ	½			Note 2
R13	220KΩ	½	98A45-21		
R14	1000Ω	½	94C37-86	BTS-1000	
R15	4700Ω	½	98A45-20	BTS-4700	
R16	220KΩ	½	98A45-21		
R17	15KΩ	½	98A45-67	BTS-15K	
R18	8200Ω	½	60B8-822	BTS-8200	
R19	10Ω	½	94C37-88		
R20	10KΩ	½	98A45-18		
R21	10KΩ	½	98A45-18	BTS-10K	
R22	150KΩ	½	60B8-154	BTS-150K	
R23	1000Ω	½	60B8-102	BTS-1000	
R24	470Ω	½	60B8-471	BTS-470	
R25	10KΩ	½	60B8-103		
R26	8200Ω-5%	½	60B7-822		
R27	47Ω	½	60B28-45		
R28	330Ω	½	60B8-331	BTS-330	
R29	15KΩ-5%	½	60B8-153		Note 3
R30	1000Ω	½	60B8-102	BTS-1000	
R31	68Ω	½	60B28-44		
R32	330Ω	½	60B8-331	BTS-330	
R33	10KΩ-5%	½	60B7-103		Note 4
R34	150Ω	½	60B8-151	BTS-150	
R35	1000Ω	½	60B8-102	BTS-1000	
R36	100KΩ	½	60B8-104	BTS-100K	
R37	4700Ω-5%	½	60B7-472	BTS-4700-5%	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA ADMIRAL PART No.	IRC PART No.	NOTES
R38	270Ω	½	60B8-271	BTS-270	
R39	15KΩ	1	60B14-153	BTA-15K	
R40	4700Ω	2	60B20-472	BTB-4700	
R41A	18KΩ	½	†63B6-4	BTS-18K	
B	270KΩ	½		BTS-270K	
R42	470KΩ	½	60B8-474	BTS-470K	
R43	560KΩ	½	60B8-564	BTS-560K	
R44	100KΩ	½	60B8-104	BTS-100K	
R45	100KΩ	½	60B8-104		
R46	150Ω	½	60B8-151	BTS-150	
R47	47KΩ	½	60B8-473		
R48	470KΩ	½	60B8-474		
R49	82Ω	½	60B28-31	BTS-82	
R50	1000Ω	½	60B8-102	BTS-1000	
R51	390Ω	½	60B8-391	BTS-390	
R52	10KΩ	½	60B8-103	BTS-10K	
R53	10KΩ	½	60B8-103	BTS-10K	
R54	47KΩ	½	60B8-473	BTS-47K	
R55	82KΩ	½	60B8-823	BTS-82K	Note 5
R56	4.7 Meg	½	60B8-475	BTS-4.7Meg	
R57A	150KΩ	½		BTS-150K	
B	47KΩ	½	†63B6-3	BTS-47K	
C	1 Meg	½		BTS-1 Meg	
R58	330Ω	1	60B14-331	BTA-330	
R59	2.2Meg	½	60B8-225	BTS-2.2Meg	
R60	33KΩ	2	60B20-333	BTB-33K	Note 6
R61	18KΩ	1	60B14-183	BTA-18K	
R62	2.2Meg	½	60B8-225	BTS-2.2Meg.	
R63	27KΩ	2	60B20-273	BTB-27K	

RESISTORS (CONT.)

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA ADMIRAL PART No.	IRC PART No.	NOTES
R64	8.2Meg	½	60B8-825	BTS-8.2Meg	
R65	1000Ω	½	60B8-102	BTS-1000	
R66	2200Ω	½	60B8-222	BTS-2200	
R67	2200Ω	½	60B8-222	BTS-2200	
R68A	22KΩ	½		BTS-22K	
B	8200Ω	½	♦63B6-2	BTS-8200	
C	8200Ω	½		BTS-8200	
R69	1.2Meg	½	60B8-125	BTS-1.2Meg	
R70	150KΩ	½	60B8-154	BTS-150K	
R71	1Meg	½	60B8-105	BTS-1Meg	
R72	10KΩ-5%	½	60B8-103	BTS-10K-5%	
R73	1Meg	½	60B8-105	BTS-1Meg	
R74	820Ω	½	60B8-821	BTS-820	
R75	820Ω	2	60B20-821	BTB-820	
R76	150KΩ	½	60B8-154	BTS-150K	
R77	6800Ω	½	60B8-682	BTS-6800	
R78	270KΩ	½	60B8-274	BTS-270K	Note 7
R79	12KΩ	2	60B20-123	BTB-12K	
R80	100KΩ-5%	½	60B7-104	BTS-100K-5%	
R81	100KΩ-5%	½	60B7-104	BTS-100K-5%	
R82	4.7Meg	½	60B8-475	BTS-4.7Meg	
R83	470KΩ	½	60B-474	BTS-470K	
R84	1500Ω	½	60B8-152	BTS-1500	
R85	5600Ω	½	60B8-562	BTS-5600	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA ADMIRAL PART No.	IRC PART No.	NOTES
R86	120KΩ	½	60B8-124	BTS-120K	
R87	150KΩ	½	60B8-154	BTS-150K	
R88	8200Ω	½	60B14-822	BTA-8200	
R89	8200Ω	½	60B8-822	BTS-8200	
R90	68Ω	½	60B28-44		
R91	1 Meg	½	60B8-105	BTS-1Meg	
R92	47Ω	1	60B14-470		
R93	15KΩ	2		BTB-15K	Note 8
R94	12KΩ	2		BTB-12K	Note 8
R95	82Ω	½	60B28-31		
R96	680Ω	2	60B20-681	BTB-680	
R97	2.7Ω	½	60B28-47		
R98	470KΩ	½	60B28-43		
R99	7500Ω	5	61A1-18	1 3/4A-7500	
R100	3000Ω	15	61A3-14	2D-3000	
R101	470KΩ	½		BTS-470K	Note 9
R102	5300Ω	5	61A3-16		Note 5
R103	22KΩ	½	60B8-223	BTS-22K	Note 5
R104	10KΩ	1	60B14-103	BTA-10K	Note 5
R105	150Ω	½	60B8-151	BTS-150	Note 5
R106	27KΩ	1	60B14-273	BTA-27K	Note 5
R107	1 Meg	½	60B8-105	BTS-1Meg	Note 5
R108	4.7Ω	1			Wire wound
R109	270KΩ	½		BTS-270K	Note 10

Note 1: Some models may use a 220KΩ resistor in this application.
Note 2: Some models may use a 100KΩ resistor in this application.
Note 3: Chassis 22M1 uses a 18KΩ resistor in this application.
Note 4: Chassis 22M1 uses a 22KΩ resistor in this application.
Note 5: Not used in chassis 22M1.
Note 6: Chassis which have no run no. stamp use a 39KΩ resistor in this application.
Note 7: Chassis which have no run no. stamp use a 220KΩ resistor in this application.
Note 8: Some models may use two 330Ω resistors in series.
Note 9: Some models may use 270KΩ resistor in this application.
Note 10: Used only in chassis 22M1.
† Items C52, R41A & R41B are combined in one unit.
† Items C49, R57A 57B & 57C are combined in one unit. Chassis 22M1 may use part no. 63B6-5
♦ Items C56A, C56B, C56C, R68A, R68B & R68C are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA ADMIRAL PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
T1	117VAC	580VCT	5VAC	6.3VAC	80C26-1	P-8164	P-3077	TP-225	R-39BC
	ⓐ 1.85A	.225ADC	ⓐ 3A	ⓐ 9A					

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING DC RESISTANCE PRI.	RATING DC RESISTANCE SEC.	REPLACEMENT DATA ADMIRAL PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	NOTES
T2	190Ω	1060Ω	79A18-4	A-8125	A-3000 ①	TBO-1 ②	A-97X ①	Vert. Osc. Trans.
T3	348Ω Tap	3.6Ω	79D38-1	A-8134	HVO-7 ①			Horiz. Output Trans.
	ⓐ 33Ω	SEC. 2 1.3Ω	79C30-4 ③					
		SEC. 3 0Ω						
T4	1120Ω	7.5Ω	79B40-1	A-8112 ①	A-3037 ①	TSO-8 ①	A-102X	Vert. Output Trans.
T5A	16Ω		94C30-3	DY-8	MDF-70	TY-3	Y-17	Horiz. Deflection Coils
B	47Ω							Vert. Deflection Coils
T6	280Ω		69C117-8					Focus Coil
	Tap ⓐ 90Ω		69C117-3 ④					

① Drill one new mtg. hole.
② Mount on top of chassis.
③ Alternate horiz. output trans.
④ Alternate focus coil.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA ADMIRAL PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	NOTES
T7	.5KΩ	3.2Ω	275Ω	.5Ω	79C33-2	A-3877 ①	A-3019 ①	RO-9	S-5X	① Drill one new mtg. hole.

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DATA ADMIRAL PART No.	JENSEN PART No.	QUAM PART No.	NOTES
SP1	10"	PM	3.2Ω	78B47-4	ST-745	10A31	① 5"speaker - Models 121K15A, 16A, 17A,
				78B59-2 ①	Mod. F10-S	5A07	520M11 ,12 ,15 ,16 ,17 , 521M15A,
				78B49-2 ②		8A21	16A, 17A, 121M10, 11A, 12A
				78B47-3 ③			② 8" speaker -Models 121K45A, 46A, 47A
							③ 10" speaker -Models 421M35, 36, 421M15A, 16A

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA ADMIRAL PART No.	MERIT PART No.	NOTES
L1	Ant. Coils	0Ω	0Ω	94C37-52		Channel 2
L2	Fil. Choke	0Ω		98A45-13		
L3	RF Choke	0Ω		94C37-89		
L4	RF, Mixer Grid & Osc. Coils	0Ω		94C37-72		Channel 2
L5	Fil. Choke	0Ω		98A45-14		
L6	Conv. Plate	.4Ω		94D45-50		
L7	1st. Video IF	.2Ω		72B106		
L8	Adj. Channel Traps	0Ω		94D45-51		
L9	Fil. Choke	0Ω		73A2-5		
L10	2nd. Video IF	.4Ω	.4Ω	72C96-14		
L11	Sound Trap	.1Ω		72C96-17		
L12	3rd. Video IF	.1Ω	.6Ω	72C96-16		
L13	4th. Video IF	8.5Ω	.4Ω	72B105-1		
L14	Peaking Coil	5.4Ω		73A5-15	TV-181 *	Wound on 4.7KΩ resistor
L15	Peaking Coil	17Ω		73A5-7	TV-188	
L16	4.5MC Trap	5Ω		72B99-3	TV-151	
L17	Peaking Coil	6.7Ω		73A5-14	TV-185 †	Wound on 18KΩ resistor
L18	Peaking Coil	23Ω		73A11-1	TV-188 ■	Wound on 10KΩ resistor
L19	Sound IF	5.3Ω		72B99-4	TV-151	
L20	Ratio Det.	3.5Ω	.2Ω CT	72B68	TV-110	Tertiary -.9Ω
L21	Fil. Choke	0Ω		73A2-5		
L22	Horiz. Lock Coil	49Ω		94A17	TV-163	
L23	Width Coil	10Ω		94A39-1		Tapped ⓐ 3.5Ω
L24	Horiz. Lin.	12.5Ω		94A28		Tapped ⓐ 7.5Ω
L25	Anti-ringing Coil	3.2Ω		73B8-2		
L26	Loop Ant.	1.4Ω		69C116-2		
L27	Osc. Coil	6.5Ω		69A52-1		Tap ⓐ .6Ω
L28	Input IF	17Ω	17Ω	72B-28-7	BC-352	
L29	Output IF	17Ω	17Ω	72B-28-7	BC-353	

* Parallel with 4.7KΩ resistor
† Parallel with 18KΩ resistor
■ Parallel with 10KΩ resistor

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA ADMIRAL PART No. FUSE	ADMIRAL PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	8AG	1/4A 250V	84A4-2	84A5-1	362.250	387001	AGX 1/4A	4520

PHONO CARTRIDGE and NEEDLE

ITEM No.	REPLACEMENT DATA ADMIRAL PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	SHURE PART No. CARTRIDGE	SHURE PART No. NEEDLE	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. NEEDLE	REMARKS
M2	409A13	AC-AG-J	A-AG	W26B	A66U	33	0-2 or 5-3	

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA ADMIRAL PART No.	WALCO PART No.	JENSEN PART No.	REMARKS
M3	98A15-19	W-30AGA	JP-312	

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA ADMIRAL PART No.		NOTES
M4	Bayonet	6-8	.15	Brown	81A1-8		Type #47
M5	Bayonet	6-8	.15	Brown	81A1-8		Type #47

MISCELLANEOUS

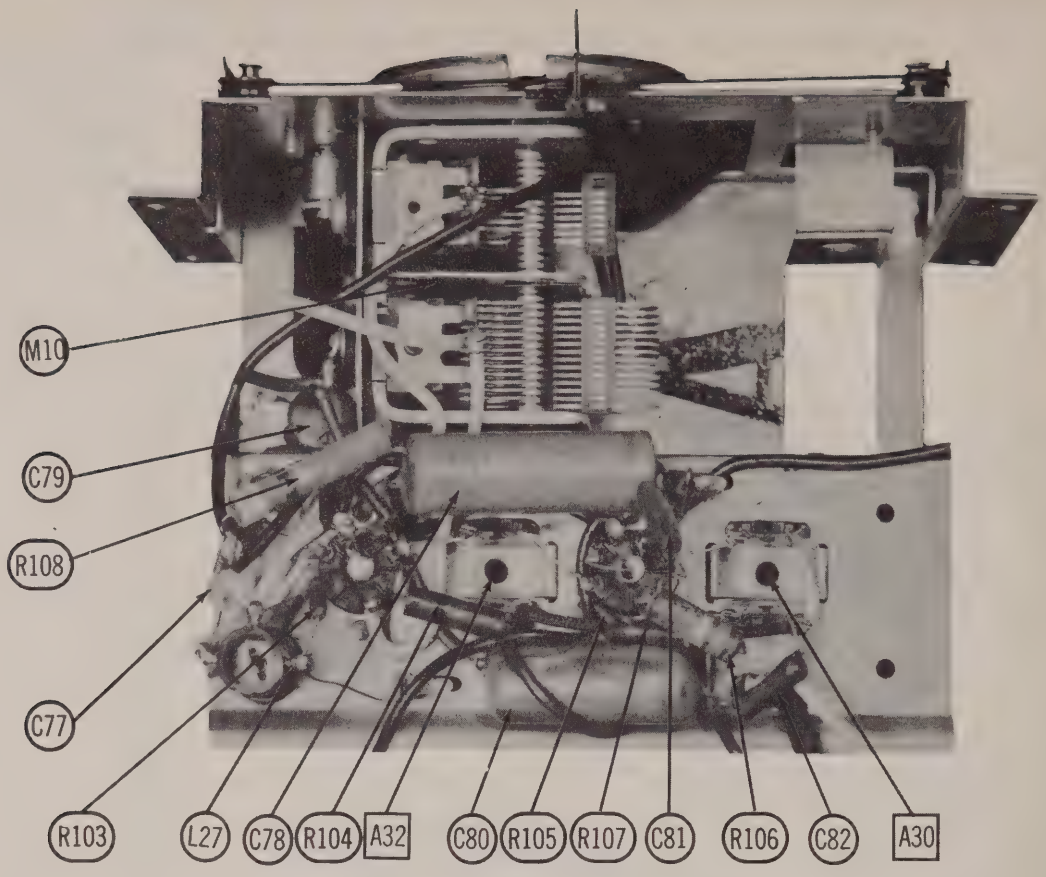
ITEM No.	PART NAME	ADMIRAL PART No.	NOTES
M6	RF Tuner	94D45-1	
M7A	Switch	77B40	Function (TV, Radio, Phono)
B	Switch	77B39-1	Alternate (TV, Radio, Phono)
C	Switch	77B39	Alternate (TV, Radio, Phono)
M8A	Switch	77B39-16	Phono Motor Off/On
B	Switch	77B39-15	Alternate
C	Switch	77B39-14	Alternate
M9	Ion Trap	94A15-2	
M10	Tuning Cap	80M48	Radio (30-460MMF, 18-164MMF)
B2	Trimmer	66A30-1	Horiz. Drive (20-280MMF)

PROPERTY OF L. F. BEANKENSH... 3924 ... DENVER

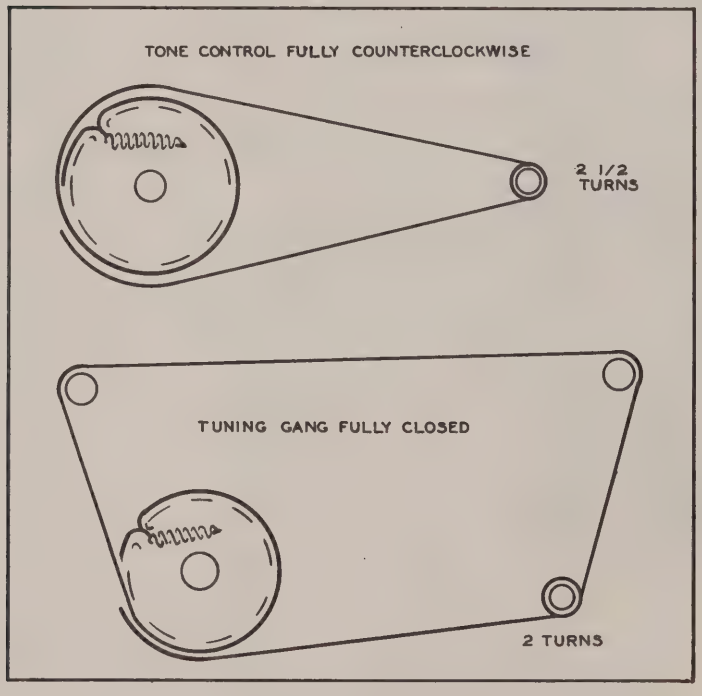
PARTS LIST AND DESCRIPTIONS (Continued)

MISCELLANEOUS

ITEM No.	PART NAME	ADMIRAL PART No.	NOTES
A34	Trimmer	66B8-5	AM Loop Ant. (2-20MMF)
	Ant. Coil	94C37-53	Channel #3
	Ant. Coil	94C37-54	Channel #4
	Ant. Coil	94C37-55	Channel #5
	Ant. Coil	94C37-56	Channel #6
	Ant. Coil	94C37-57	Channel #7
	Ant. Coil	94C37-58	Channel #8
	Ant. Coil	94C37-59	Channel #9
	Ant. Coil	94C37-60	Channel #10
	Ant. Coil	94C37-61	Channel #11
	Ant. Coil	94C37-62	Channel #12
	Ant. Coil	94C37-63	Channel #13
	RF, Mixer Grid & Osc. Coil	94C37-73	Channel #3
	RF, Mixer Grid & Osc. Coil	94C37-74	Channel #4
	RF, Mixer Grid & Osc. Coil	94C37-75	Channel #5
	RF, Mixer Grid & Osc. Coil	94C37-76	Channel #6
	RF, Mixer Grid & Osc. Coil	94C37-77	Channel #7
	RF, Mixer Grid & Osc. Coil	94C37-78	Channel #8
	RF, Mixer Grid & Osc. Coil	94C37-79	Channel #9
	RF, Mixer Grid & Osc. Coil	94C37-80	Channel #10
	RF, Mixer Grid & Osc. Coil	94C37-81	Channel #11
	RF, Mixer Grid & Osc. Coil	94C37-82	Channel #12
	RF, Mixer Grid & Osc. Coil	94C37-83	Channel #13
	Knob	33C53-9	Channel Selector (Maroon)
	Knob	33C53-5	Channel Selector Less Inserts (Maroon)
	Knob	33C53-10	Fine Tuning (Maroon)
	Knob	33C53-11	Off/On Volume (Maroon)
	Knob	33C53-7	Off/On Volume Less Inserts (Maroon)
	Knob	33C53-12	Contrast (Maroon)
	Knob	33C53-13	Channel Selector (Ebony)
	Knob	33C53-1	Channel Selector Less Inserts (Ebony)
	Knob	33C53-14	Fine Tuning (Ebony)
	Knob	33C53-15	Off/On Volume (Ebony)
	Knob	33C53-3	Off/On Volume Less Inserts (Ebony)
	Knob	33C53-16	Contrast (Ebony)
	Knob	33C83-1	Radio Tuning
	Knob	33D55-36	Tone
	Knob	33C83-2	TV, Radio, Phono
	Washers	5A4-14	Felt (2) used behind Channel Selector & Contrast IKnobs
	Washers	5A4-11	Felt (2) used behind Radio Tuning & Tone Knobs
	Back Cover	A3625	Complete (Models 321M25A, 321M26A, 321M27A)
	Back Cover	A3627	Complete (Models 421M15A, 421M16A)
	Back Cover	A3629	Complete (Models 521M15A, 521M16A, 521M17A)
	Back Cover	A3644	Complete (Models 121M10, 121M11A, 121M12A)
	Back Cover	A3526	Complete (Models 121K15A, 121K16A, 121K17A, 221K45A, 221K46A & 221K47A)
	Back Cover	A3628	Complete (Models 421M35, 421M36 & 421M37)
	Back Cover	A3661	Complete (models 520M15, 520M16 &520M17)
	Back Cover	A3662	Complete (Models 520M11 & 520M12)
	Safety Glass	21B49-16	Models 321M25A, 321M26A, 321M27A, 421M15A, 421M16A, 521M15A, 521M16A & 521M17A)
	Safety Glass	21B49-21	Models 121M10, 121M11A, 121M12A, 520M11 & 520M12
	Safety Glass	21B49-10	Models 121K15A, 121K16A, 121K17A, 221K45A, 221K46A & 221K47A
	Safety Glass	21B62-6	Models 421M35, 421M36 & 421M37.
	Safety Glass	21B62-2	Models 520M15, 520M16 & 520M17
	Mask	23D115	Models 321M25A, 321M26A, 321M27A, 421M15A, 421M16A 521M15A, 521M16A, 521M17A, 421M35, 421M36 & 421M37
	Mask	23D110	Models 121M10, 121M11A, 121M12A, 520M11 & 520M12
	Mask	23D104	Models 121K15A, 121K16A, 121K17A, 221K45A, 221K46A & 221K47A
	Mask	23D120	Models 520M15, 520M16 & 520M17



RADIO CHASSIS BOTTOM VIEW



DRIVE CORD STRINGING

PHOTOFACT* Folder

FADA
MODELS 20C22, 20T12, 24T10

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MODEL 20C22

FADA
MODELS 20C22, 20T12, 24T10

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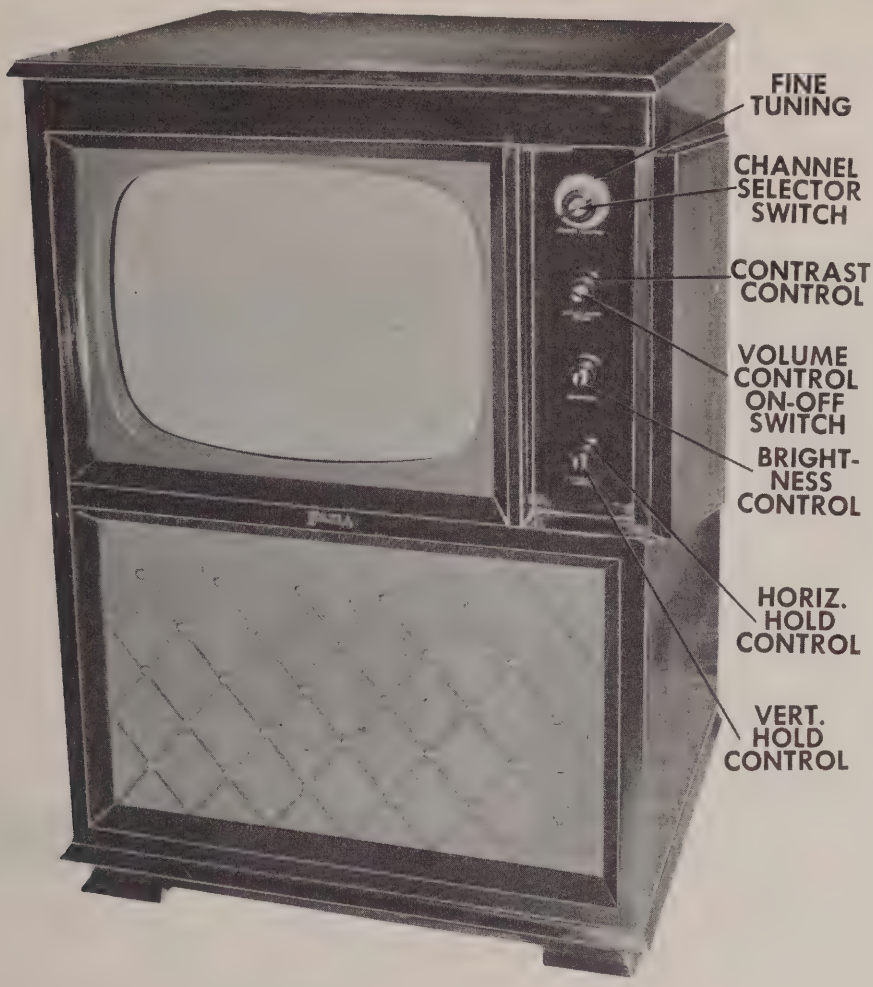
DATE 9-52 SET 180 FOLDER 3

FADA
MODELS 20C22, 20T12, 24T10



FADA 20C22

TRADE NAME	Fada Models 20C22, 20T12, 24T10
MANUFACTURER	Fada Radio & Electric Co., Inc., 525 Main St., Belleville, New Jersey
TYPE SET	Television Receiver
TUBES	Twenty-one
POWER SUPPLY	110-120 Volts AC-60 Cycle
RATING	2.3 Amp. @ 117 Volts AC
TUNING RANGE— Channels	2 thru 13

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FADA
MODELS 20C22, 20T12, 24T10

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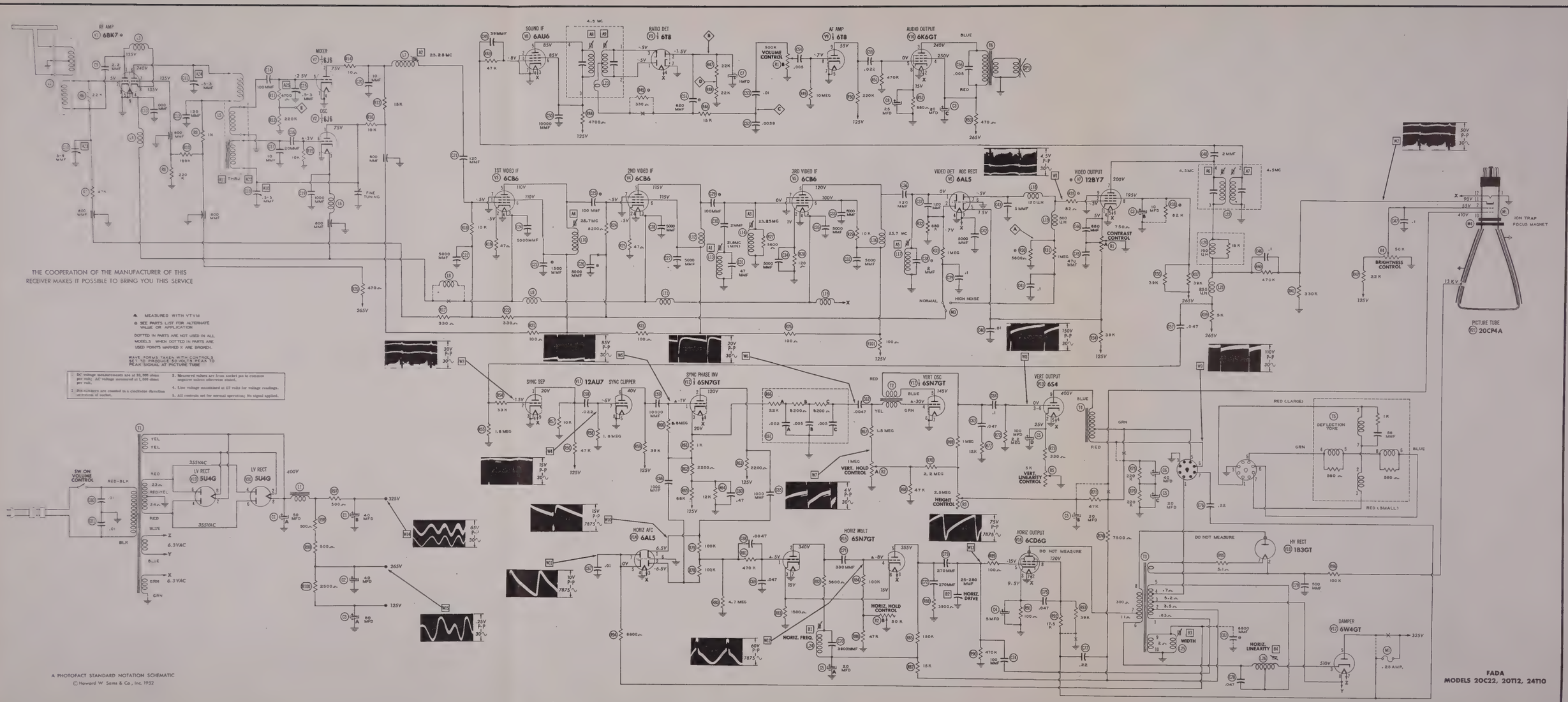
RF AMP V1 6BK7
MIXER V7 6J6
OSC V2 6J6
SOUND IF V8 6AU6
RATIO DET V9 6T8
AF AMP V9 6T8
AUDIO OUTPUT V10 6K6GT
1ST VIDEO IF V3 6CB6
2ND VIDEO IF V4 6CB6
3RD VIDEO IF V5 6CB6
VIDEO DET AGC RECT V6 6AL5
VIDEO OUTPUT V17 12BY7
SYNC SEP V11 12AU7
SYNC CLIPPER
SYNC PHASE INV V12 6SN7GT
VERT OSC V12 6SN7GT
VERT OUTPUT V13 6S4
HORIZ AFC V14 6AL5
HORIZ MULT V15 6SN7GT
HORIZ OUTPUT V16 6CD6G
LV RECT V18 5U4G
LV RECT V20 5U4G
HV RECT V19 1B3GT
DAMPER V17 6W4GT
PICTURE TUBE V21 20CP4A
ION TRAP FOCUS MAGNET
VOLUME CONTROL
CONTRAST CONTROL
BRIGHTNESS CONTROL
VERT. HOLD CONTROL
HEIGHT CONTROL
VERT LINEARITY CONTROL
HORIZ. HOLD CONTROL
HORIZ. FREQ.
HORIZ. DRIVE
WIDTH
HORIZ. LINEARITY
DEFLECTION YOKE
SW ON VOLUME CONTROL
FINE TUNING
NORMAL
HIGH NOISE
DO NOT MEASURE
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
▲ MEASURED WITH VTVM
⊕ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DOTTED IN PARTS ARE NOT USED IN ALL MODELS WHEN DOTTED IN PARTS ARE USED POINTS MARKED X ARE BROKEN.
WAVE FORMS TAKEN WITH CONTROL SET TO PRODUCE 30 VOLTS PEAK TO PEAK SIGNAL AT PICTURE TUBE
1. DC voltage measurements are at 20,000 ohms per volt; AC voltage measured at 1,000 ohms per volt.
2. Resistances are counted in a clockwise direction starting at socket.
2. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation; No signal applied.
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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FADA MODELS 20C22, 20T12, 24T10

FADA
MODELS 20C22, 20T12, 24T10

HORIZ. LINEARITY
B4
T3
C79
R96
V18
R95
C5
V20
T4
R99
V13
R97
T2
R98
V12
V10
A9
V9
L23
R100
A11
THRU
A22
M2
A2
A10
A25
V2
A24
V1
A23
V3
A4
V4
C1
A3
A1
V5
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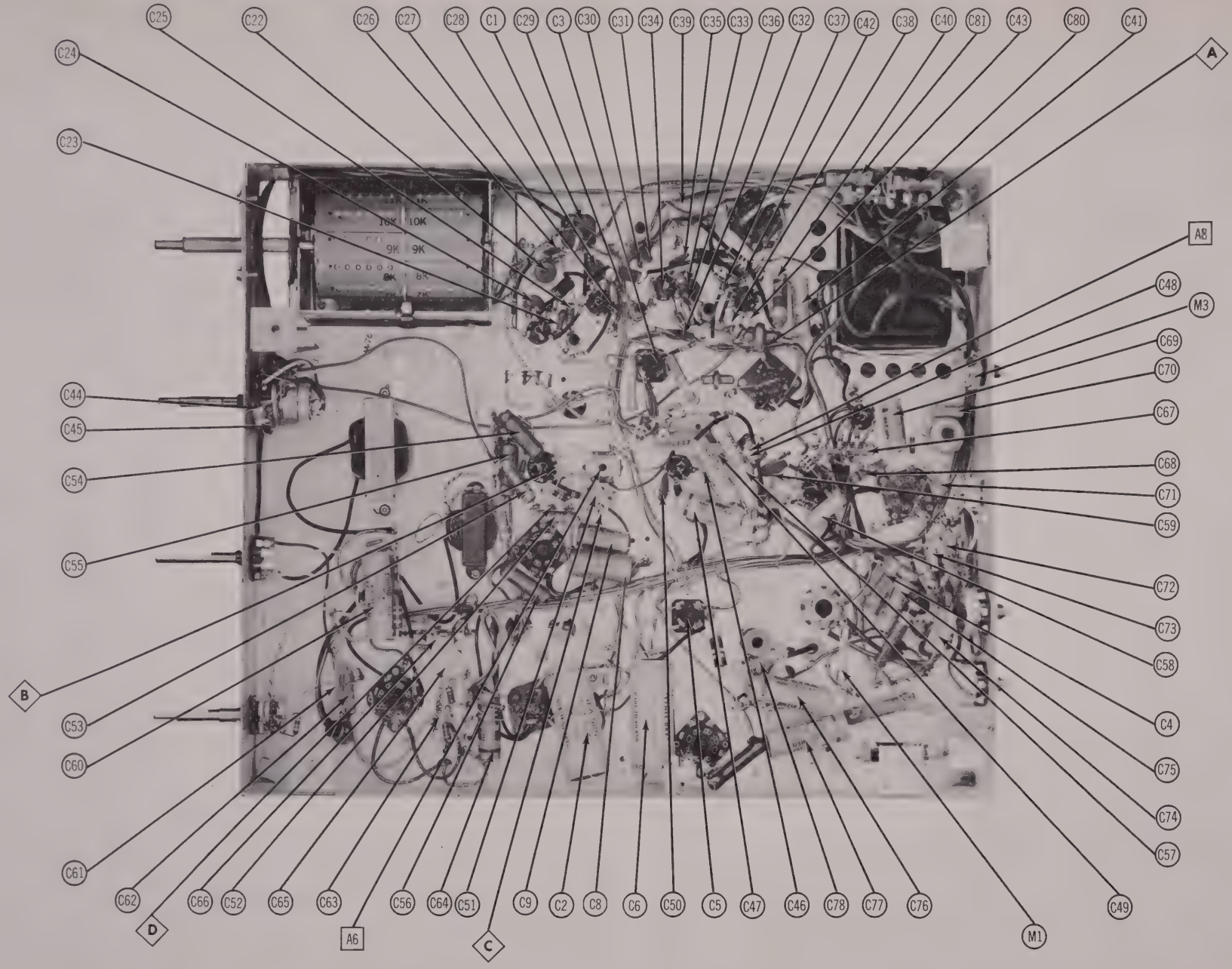
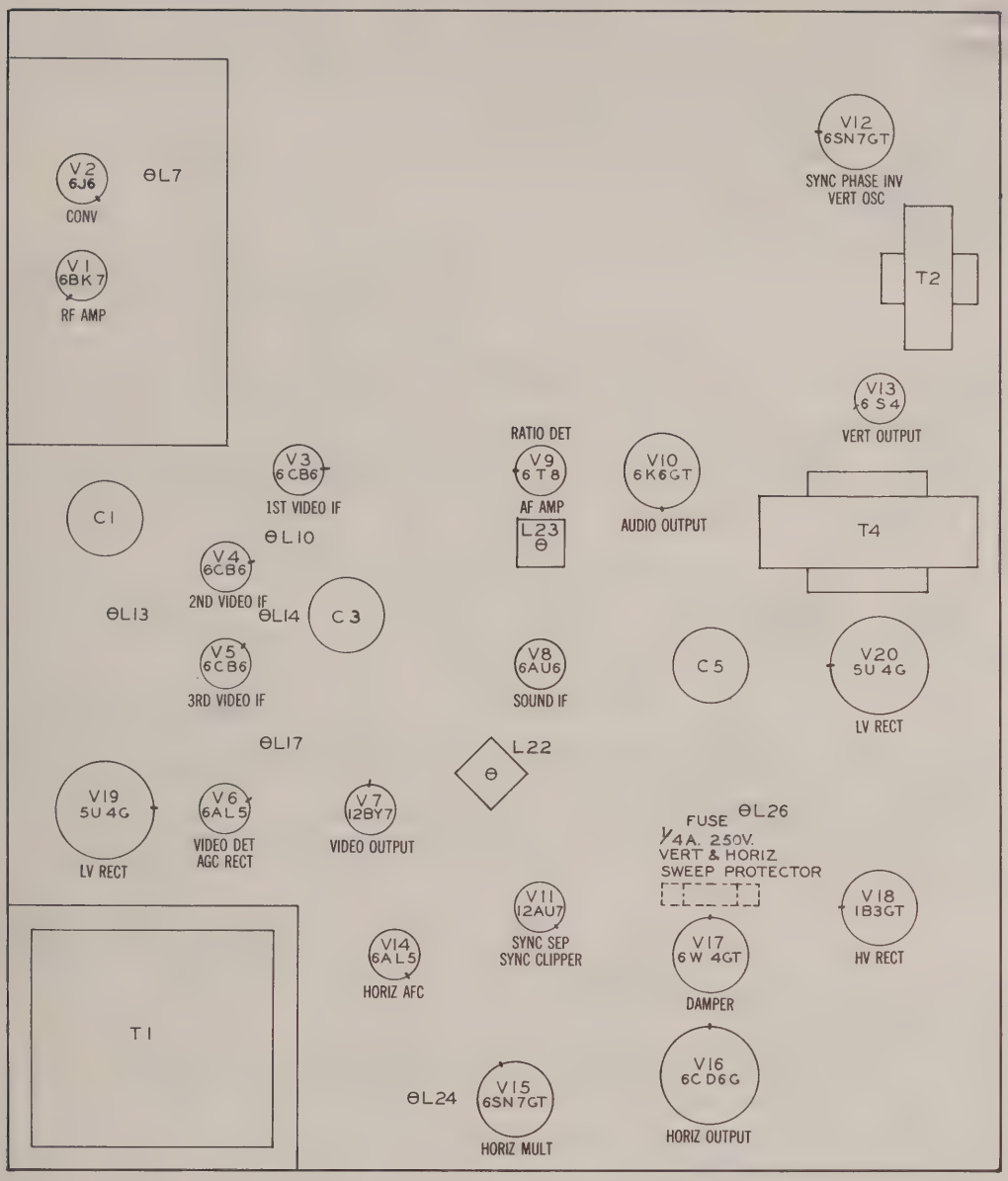
T1
L22
A7
V14
V11
V15
V16
V17



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

TUBE PLACEMENT CHART



TOP VIEW

TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound-V19-V20

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster-V2, V3, V4, V5, V6, V7
No pic, no sound, has snow-V1, V2, V3
No pic, has sound, has raster-V7, V21
Has pic, no sound, -V8, V9, V10
Overloaded picture-V6

SYNC FAILURE
No vert. sync. -V12
No horiz. sync. -V12, V14, V15
No vert. or horiz. sync. -V11, V12

SWEEP FAILURE
No raster, has sound-V15, V16, V17, V18, V21
No vertical deflection-V13
Poor vert. linearity or foldover-V12, V13
Poor horiz. linearity or foldover-V15, V16, V17
Narrow picture-V15, V16, V17, V18, V19, V20
Vert off freq. -V12
Horiz. off freq. -V12, V14, V15

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from the chassis. Do not remove the horizontal multibrator tube to disable the high voltage.

VIDEO IF ALIGNMENT

Remove the converter tube, V2, from its socket and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications.
Connect the negative lead of a 4.5 volt battery to the ungrounded side of C22. Connect the positive lead to chassis.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube (V2). Low side to chassis.	21.6MC (Unmod.)	Any	DC probe to point (A). Common to chassis.	A1	Adjust for MINIMUM deflection.
2.	"	"	23.25MC	"	"	A2, A3	Adjust for maximum deflection. Attenuate generator output to maintain approximately 2.5 volts at VTVM.
3.	"	"	25.7MC	"	"	A4, A5	"

OVERALL VIDEO IF RESPONSE CHECK

Leave bias battery connected as under Video IF Alignment. If output of sweep generator is too low to give a usable indication on scope reduce the bias to 3 volts.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
4.	Direct	High side to an ungrounded tube shield floating over dummy converter tube (V2). Low side to chassis.	24MC (10MC Swp)	21.6MC 22.7MC 26.1MC	Any	Vert. amp. to point (A). Low side to chassis.		Check for response curve as per fig. 1. If necessary retouch A2 thru A5 for proper response.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
5.	.001MFD	High side to point (A). Low side to chassis.	4.5MC (Unmod.)	Any	DC probe to point (B). Common to chassis.	A6, A7, A8	Adjust for maximum deflection.
6.	"	"	"	"	DC probe to point (C). Common to point (D).	A9	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	.001MFD	High side to point (A). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. amp. to point (B). Low side to chassis.	A6, A7, A8	Disconnect stabilizer capacitor C7. Adjust for curve of maximum amplitude and symmetry as per fig. 2.
6.	"	"	"	"	"	Vert. amp. to point (C). Low side to chassis.	A9	Reconnect capacitor C7. Adjust so that 4.5MC occurs at center of crossover lines as per fig. 3. SLIGHTLY retouch A8 for maximum amplitude and straightness of crossover lines.

OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket.
Complete oscillator alignment may not be necessary.
If the oscillator seems to be off frequency approximately the same amount for a majority of the channels it may be possible to correct them in one step using A10. It should be noted that this is an all channel oscillator circuit adjustment and should not be used to correct for any individual channel. If adjustment of A10 will not bring all channels well within the range of the fine tuning control it will be necessary to adjust the channel strip adjustment for each channel that is off frequency. The channel adjustment screws are reached through a hole just to the right of the channel switch shaft. The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. amp. to point (A). Low side to chassis.	A11	Adjust to place sound marker in notch as per fig. 4. Video marker should be at 50% of response.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A12	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A13	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A14	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A15	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A16	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A17	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A18	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A19	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A20	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A21	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A22	

ALIGNMENT INSTRUCTIONS (CONT.)

RF AND MIXER ALIGNMENT

Connect a 3 volt bias battery as under Video IF Alignment.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	207MC (10MC Swp)	205.25MC 209.75MC	12	Vert. amp. thru 10KΩ to point (E). Low side to chassis.	A23, A24, A25	Adjust for response curve similar to fig. 5. with markers above 90%.
9.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13			Check all channels for response similar to fig. 5. If markers fall below 70% on any channel make slight compromise adjustment of A23, A24, and A25 with selector switch set to that channel. Recheck all other channels to see that they have not been seriously affected.
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

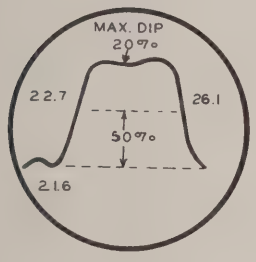


FIG. 1

FIG. 2

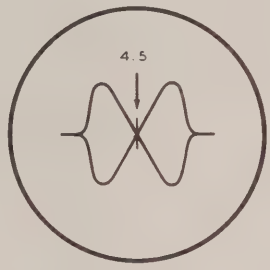


FIG. 3

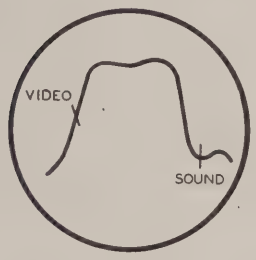


FIG. 4

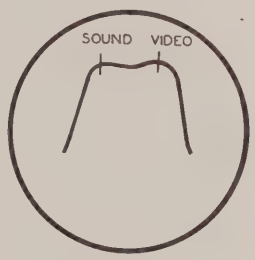
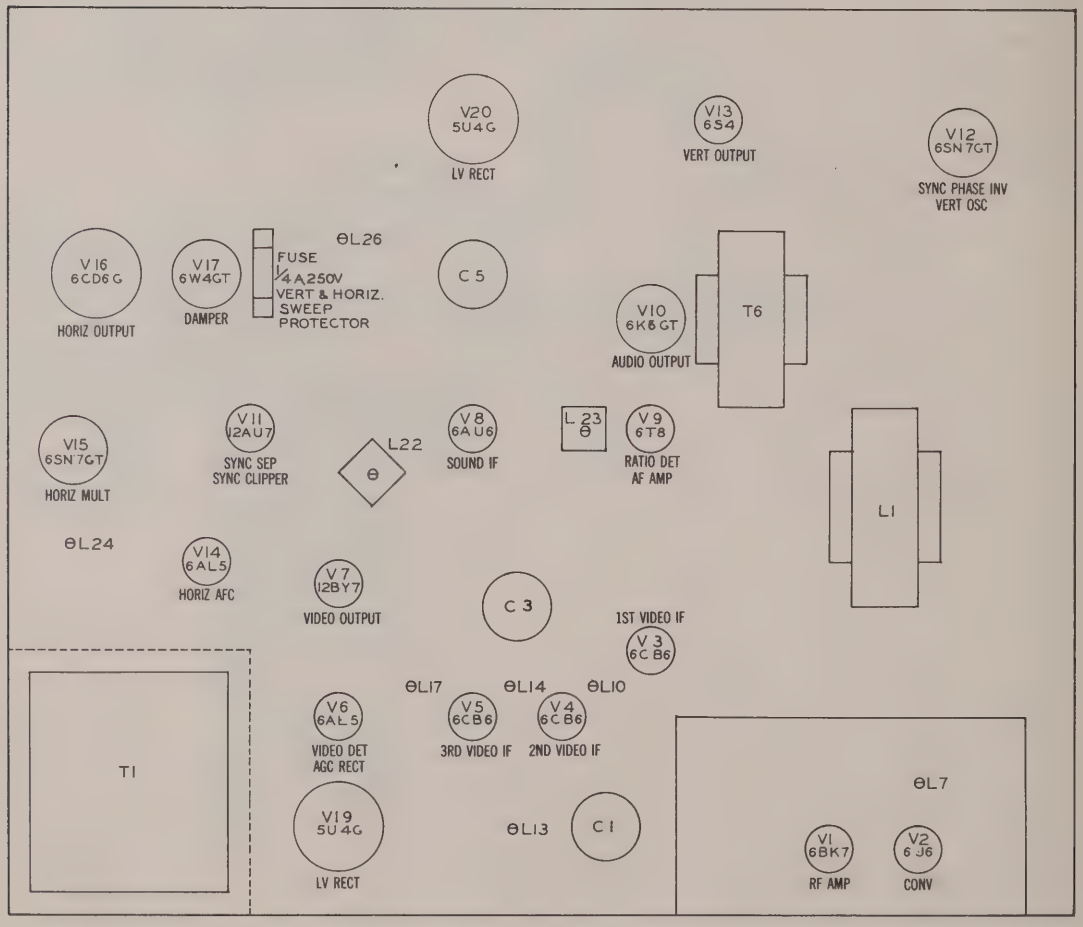


FIG. 5

RESISTANCE MEASUREMENTS

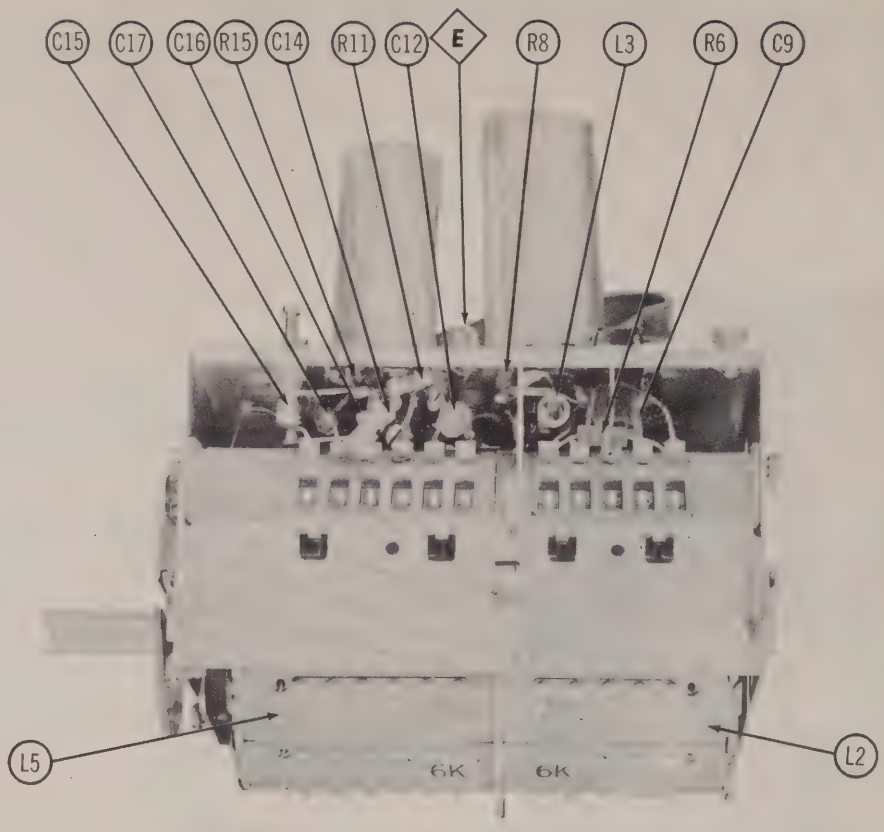
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BK7	INF	1.7Meg	0Ω	.1Ω	0Ω	†2.5KΩ	†100KΩ	INF	0Ω
V 2	6J6	†14KΩ	†19KΩ	.1Ω	0Ω	220KΩ	10KΩ	0Ω		
V 3	6CB6	1.7Meg	47Ω	.1Ω	0Ω	†3.8KΩ	†3.8KΩ	0Ω		
V 4	6CB6	1.7Meg	47Ω	.1Ω	0Ω	†3.7KΩ	†3.7KΩ	0Ω		
V 5	6CB6	.1Ω	120Ω	.1Ω	0Ω	†3.6KΩ	†13KΩ	0Ω		
V 6	6AL5	.1Ω	680KΩ	.1Ω	0Ω	550Ω	0Ω	5.6KΩ		
V 7	12BY7	210Ω	5.7KΩ	0Ω	0Ω	0Ω	.1Ω	†6KΩ	†20KΩ	0Ω
V 8	6AU6	47KΩ	0Ω	.1Ω	0Ω	†8.2KΩ	†8.2KΩ	0Ω		
V 9	6T8	INF	44KΩ	INF	.1Ω	0Ω	INF	0Ω	10Meg	†220KΩ
V 10	6K6GT	INF	.1Ω	†1.9KΩ	†1.5KΩ	470KΩ	INF	0Ω	680Ω	
V 11	12AU7	9KΩ	1.8Meg	0Ω	0Ω	0Ω	†42KΩ	1.8Meg	0Ω	.1Ω
V 12	6SN7GT	6.8Meg	†5.7KΩ	15KΩ	2Meg	1.3Meg	0Ω	0Ω	.1Ω	
V 13	6S4	INF	2.5KΩ	2.2Meg	.1Ω	0Ω	2.2Meg	INF	INF	#9KΩ
V 14	6AL5	4.8Meg	4.8Meg	.1Ω	0Ω	6.8KΩ	0Ω	6.8KΩ		
V 15	6SN7GT	5.1Meg	#20KΩ	1.5KΩ	130KΩ	#165KΩ	1.5KΩ	0Ω	.1Ω	
V 16	6CD6G	INF	.1Ω	100Ω	470KΩ	470KΩ	INF	0Ω	†13KΩ	TOP CAP #16Ω
V 17	6W4GT	INF	INF	120KΩ	INF	†565Ω	†565Ω	#6.9Ω	#6.8Ω	
V 18	1B3GT	PINS 1-8 HAVE INF RESISTANCE								TOP CAP #316Ω
V 19	5U4G	INF	11KΩ	INF	24Ω	INF	23Ω	INF	11KΩ	
V 20	5U4G	INF	11KΩ	INF	23Ω	INF	24Ω	INF	11KΩ	
V 21	20CP4A	0Ω	20KΩ	PIN 10 #7.5KΩ	PIN 11 195KΩ	PIN 12 .1Ω				

ALL CONTROLS SET FOR NORMAL OPERATION, NO SIGNAL APPLIED
AGC SWITCH IN NORMAL AREA POSITION
† MEASURED FROM PIN 2 OF V19 PIN 8 OF V20
# MEASURED FROM PIN 3 OF V17

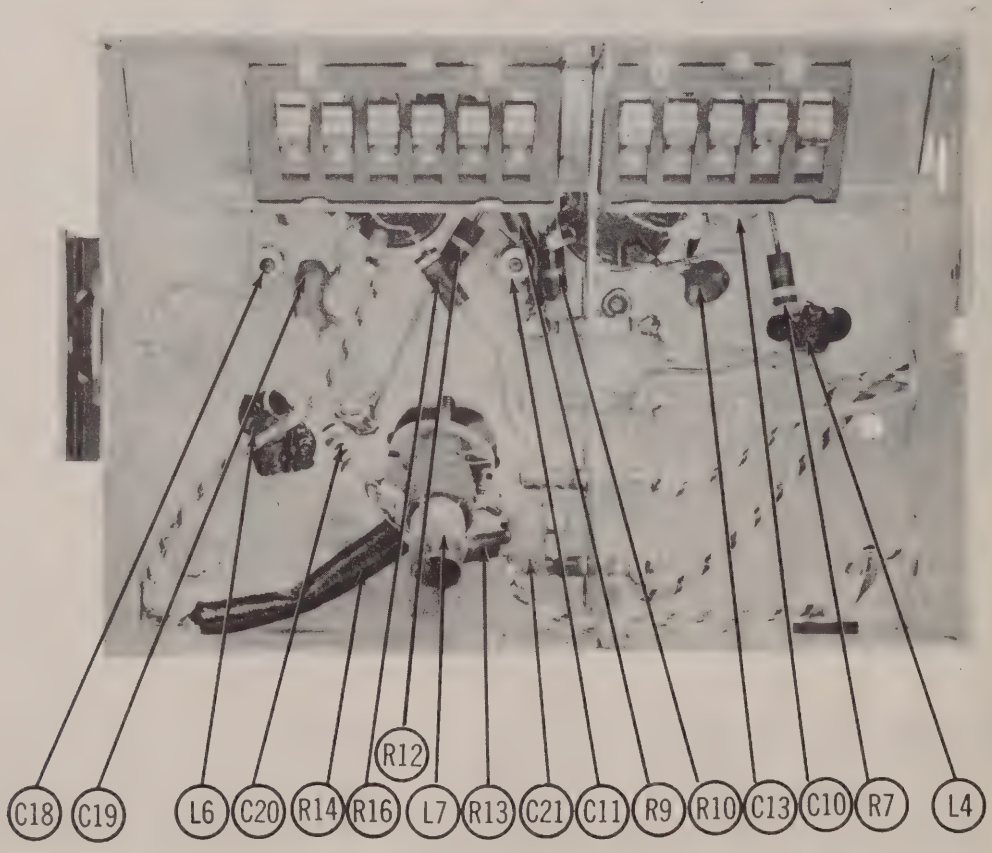


BOTTOM VIEW

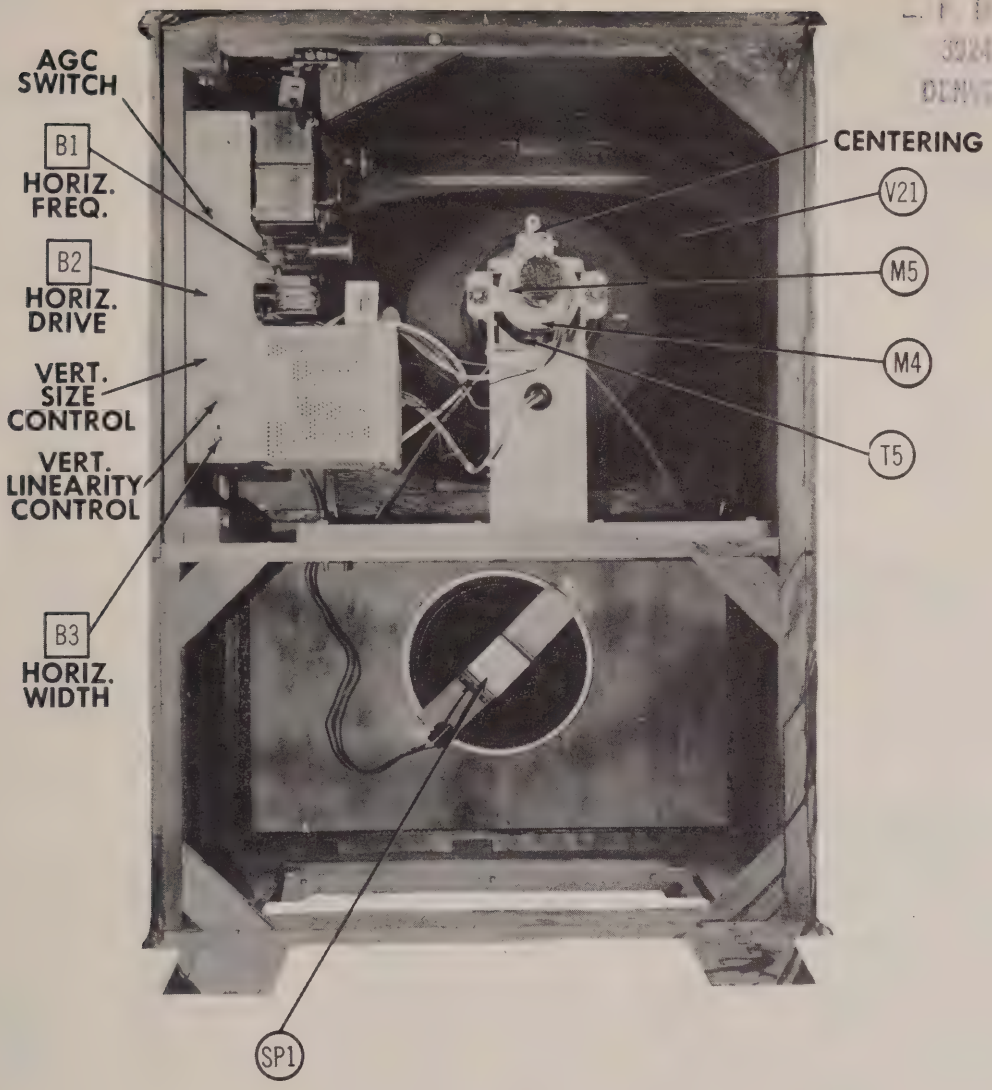
TUBE PLACEMENT CHART



RF TUNER-RIGHT SIDE



RF TUNER-BOTTOM VIEW



CABINET-REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Set the horizontal hold at the mid-position of its range and adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally.

Adjust the horizontal drive trimmer (B2) to the maximum counter clockwise position without the presence of a vertical white line in the picture.

Adjust the width slug (B3) for a picture slightly wider than enough to fill the picture mask horizontally.

Adjust the horizontal linearity slug (B4) for a picture that is symmetrical from left to right.

DISASSEMBLY INSTRUCTIONS

1. Remove 7 push on type control knobs from front panel.
2. Remove 11 wood screws. Remove rear cover.
3. Disconnect speaker, deflection and focus plug, CRT socket, built-in antenna and HV lead.
4. Remove 2 wood screws. Remove antenna bracket from cabinet.
5. Remove 1 screw and 1 nut holding speaker. Remove speaker.
6. Remove 2 chassis mounting board bolts and remove from cabinet.

NOTE: FOR PICTURE TUBE REMOVAL IT IS NECESSARY TO REMOVE CHASSIS AS OUTLINED ABOVE.

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: FADA PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V1A	RF Amplifier	6BK7	6BK7	9AJ	
B	RF Amplifier	6BQ7	6BQ7	9AJ	
V2	Converter	6J6	6J6	7BF	
V3	1st. Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V6	Video Detector-AGC Rectifier	6AL5	6AL5	6BT	
V7A	Video Output	12BY7	12BY7	9BF	
B	Video Output	6AG7	6AG7	8Y	
V8	Sound IF Amp.	6AU6	6AU6	7BK	
V9	Ratio Detector-AF Amplifier	6T8	6T8	9E	
V10	Audio Output	6K6GT	6K6GT	7S	
V11	Sync. Separator Sync. Clipper	12AU7	12AU7	9A	
V12	Sync. Phase Inv.-Vert. Oscillator	6SN7GT	6SN7GT	8BD	
V13	Vert. Output	6S4	6S4	9AC	
V14	Horiz. AFC	6AL5	6AL5	6BT	
V15	Horiz. Mult.	6SN7GT	6SN7GT	8BD	
V16	Horiz. Output	6CD6G	6CD6G	5BT	
V17	Damper	6W4GT	6W4GT	4CG	
V18	HV Rectifier	1B3GT	1B3GT	3C	
V19	LV Rectifier	5U4G	5U4G	5T	
V20	LV Rectifier	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: FADA PART No.	REPLACEMENT DATA: SYLVANIA PART No.	RTMA BASE TYPE	NOTES
V21	20CP4A	20CP4A 20CP4 ① 20DP4 ①② 20DP4A ② 20HP4 ① 20HP4A ①② 20LP4 ①	12D	① Circuit changes necessary ② 3/8" longer

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: FADA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	▲50	475	22.79	AFH2-72		UPT6450		FP262	TVL-2830	
B	▲40	475								
C2	40	450	22.82	PRS450/40		BR4045A		TC78	TVA-1712	
C3A	■80	350	23.80D	AFH3-43		UPT245-835		FP450	TVL-2672 TVA-1709	
B	▲10	350		PRS450/20		BR1035				
C	▲20	450								
C4	5	50	22.56	PRS150/4		BR550		TC30	TVA-1303	
C5A	■20	450	22.81	AFH4-80		UPT2245-V10		FP437	TVL-3780 TVA-1310	
B	▲20	450								
C	▲20	450								
D	100	50								
C6	40	450	22.82	PRS450/40		BR4045A		TC78	TVA-1712	
C7	1	150	22.70	PRS150/4		BR415		TC40	TVA-1402	
C8	25	50	22.66	PRS50/25		BR255A		TC36	TVA-1306	
C9	2.2				TCZ-2.2		NP0K-2R2		5TCCB-V22	
C10	3-9				829-10			CT565A		
C11	.5-3				829-3			CT565A		
C12	120			SII20	D6-121	TM5T12	GP2K-121	UC-5312	5GA-T12	
C13	1000			SII000	D6-103	TM5D1	GP2L-102	UC-521	5HK-D1	
C14	100			SII00	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C15	.5-3				829-3			CT565A		
C16	20			SI20NP0	TCZ-20		NP0K-200	ZT-542	5TCL-Q2	
C17	10			SI10N750	TCN-10		N750K-100	NT-541	5TCU-Q1	
C18	.5-3				829-3			CT565A		
C19	1000			BPD-001	DD-102	TM5D1	801- 001	DC-102	5HK-D1	
C20	10			SI10NP0	TCZ-10		NP0K-100	ZT-541	5TCC-Q1	
C21	120			SII20	D6-121	TM5T12	GP2K-121	UC-5312	5GA-T12	
C22	5000		17.44	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C23	1500		17.45	SII500	D6-152	TM5D15	801-0015	UC-5215	5HK-D15	Note 1
C24	5000		17.44	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	Note 5
C25	100			SII00	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	Note 2
C26	5000		17.44	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C27	5000		17.44	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C28	5000		17.44	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C29	100			SII00	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	Note 2
C30	2		17.127		TCZ-2.2		NP0K-020		5TCCB-V22	
C31	47		17.130	SI47NP0	TCZ-47		NP0L-470	ZT-5447	5TCC-Q47	
C32	5000		17.44	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C33	5000		17.44	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C34	5000		17.44	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C35	5000		17.44	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C36	120		17.106	SII20	D6-121	TM5T12	GP2K-121	UC-5312	5GA-T12	
C37	120		17.106	SII20	D6-121	TM5T12	GP2K-121	UC-5312	5GA-T12	
C38	2				TCZ-2.2		NP0K-020		5TCCB-V22	Note 3
C39	.1	200	12.49	P288-1	DF-104	PJT2P1		PT401	2TM-P1	
C40	.01	400	12.72	P488-01	D6-103	PTE4S1	GP2-333-103	PT4IL	4TM-S1	
C41	.1	200	12.49	P288-1	DF-104	PJT2P1		PT401	2TM-P1	
C42	5000		17.44	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D1	
C43	5		17.79	SI5	TCZ-4.7	5W5V5	GP1K-050	ZT-555	5GA-V5	
C44	680		17.108	SI680	D6-681	2R5T7	GP2K-681	UC-5368	5GA-T68	
C45	470		17.107	SI470	D6-471	5R5T5	GP2K-471	UC-5347	5GA-T47	
C46	.1	600	12.60	P688-1	DF-104	PTE6P1		PT601	6TM-P1	
C47	.1	400	12.75	P488-1	DF-104	PTE4P1		PT401	4TM-P1	

CAPACITORS (CONT.)

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: FADA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C48	2		17.59		TCZ-2.2		NP0K-020		5TCCB-V22	
C49	39		17.105	SI39	D6-390	5W5Q4	GP1K-390	UC-5339	5GA-G39	
C50	10000		17.80	BPD-01	DD-103	TM5S1	821-01	DC-51i	5HK-S1	
C51	620	500	17.125							Note 4
C52	.0039	400	12.71	P688-004	D6-402	PTE6D4	GP2-333-402	PT624	6TM-D4	
C53	.01	400	12.72	P488-01	D6-103	PTE4S1	GP2-333-103	PT4II	4TM-S1	
C54	.005	400	12.68	P688-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5	
C55	.022	400	12.82	P488-022	DF-203	PTE4S22		PT4122	4TM-S22	
C56	.005	400	12.68	P688-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5	
C57	.047	400	12.67	P488-047	DF-503	PTE4S47		PT4147	4TM-S47	
C58	.022	400	12.82	P488-022	DF-203	PTE4S22		PT4122	4TM-S22	
C59	10000		17.80	BPD-01	DD-103	TM5S1	821-01	DC-51i	5HK-S1	
C60	.47	200	12.92	P288-47		PJT2P5		PT405	2TM-P47	
C61A	.002			P688-002		PTE6D2		PT622		
B	.005		♦167.1	P688-005	♦PC-100	PTE6D5	♦1405-01	PT625	♦101C1	
C	.005			P688-005		PTE6D5		PT625		
C62	.0047	600	12.83	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	
C63	.047	400	12.67	P488-047	DF-503	PTE4S47		PT4147	4TM-S47	
C64	.1	400	12.75	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C65	1000		17.109	SI1000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C66	1000		17.109	SI1000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C67	.01	400	12.72	P488-01	D6-103	PTE4S1	GP2-333-103	PT4II	4TM-S1	
C68	.0047	600	12.68	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	
C69	.047	400	12.67	P488-047	DF-503	PTE4S47		PT4147	4TM-S47	
C70	3900	500	17.113	1464-004		1DR5D4		MCB463		
C71	330	500	17.69	1469-00035						
C72	270	500	17.123	1469-0003		5R5T3		MCB241	MS-33	
C73	270	500	17.123	1469-0003		5R5T3		MCB241	MS-33	
C74	100	2500	17.129							
C75	.047	600	12.66	P688-047	DF-503	PTE6S47		PT6147	6TM-S47	
C76	.22	400	12.77	P488-22		PTE4P22		PT4025	4TM-P22	
C77	.22	400	12.77	P488-22		PTE4P22		PT4025	4TM-P22	
C78	.047	400	12.67	P488-047		PTE4S47		PT4147	4TM-S47	
C79	500	20000	17.116	HV20A	TV1-502	MMA-20T5	413-501	HV20035	20DK-T5	
C80	.01	600	12.72	6892GXY-01		PJ6S1		PT611	6TM-S1	
C81	.01	600	12.72	6892GXY-01		PJ6S1		PT611	6TM-S1	
C82	6800		17.35	SI6800	D6-682	ID3D7	GP2-333-682	UC-5268	5HK-D68	Note 5

Note 1. Some Models use 5000MMF in this application (Part #17.44)
Note 2. Some Models use 120MMF in this application (Part #17.106)
Note 3. Some Models use 3MMF in this application (Part #17.131)
Note 4. Some Models use 330MMF in this application
Note 5. Not used in all Models
♦ Items C61A, C61B, C61C, R66A, R66B, R66C are combined in one unit.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: FADA PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	750Ω	2	52.64	QJ-270*	RTV-109		WF751-T251	Contrast-Tapped ② 500Ω-Wire wound-Panel
B	500KΩ	½					UR55A	Volume-Rear
C	Switch						US-26	Attach to R1B
R2A	1Meg	½	52.66	QJ-168**	RTV-110	SBB-510	UF-16L	Vert hold-Panel
B	50KΩ	½					UR54L	Horiz. hold-Rear
R3A	2.5Meg	½	52.24	QJ1-239	AG-84-8	AB-83	SU-565	Height
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R3A
R4A	50KΩ	½	52.69	QJ1-123	AG-44-8	B-31	U-35	Brightness
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R4A
R5A	5000Ω	2	52.68	W-5000	A43-5000	VK-135	R5000L	Vert linearity-Wire wound
B	Shaft		Not Req.	Not Req	FKS-1/4	Not Req.	Not Req.	Attach to R5A

* CONCENTRIKIT EQUIVALENT-KIT K-3 BASE ELEMENTS & SHAFTS W17-105X & P4-124 (PANEL)
B13-133 & R1-212 (REAR) & SWITCH 76-1.
** CONCENTRIKIT EQUIVALENT-KIT K-2, BASE ELEMENTS & SHAFTS B11-137 & P1-126 (PANEL)
B11-123 & R1-212 (REAR)

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: FADA PART No.	IRC PART No.	NOTES
R6	22KΩ	½			
R7	47KΩ	½			
R8	220KΩ	½		BTS-220K	
R9	1000Ω	½		BTS-1000	
R10	180KΩ-5%	½		BTS-180K-5%	
R11	4700Ω	½		BTS-4700	
R12	220KΩ	½		BTS-220K	
R13	15KΩ	½		BTS-15K	
R14	10Ω	½			
R15	10KΩ	½			
R16	33KΩ	½			
R17	330Ω	½	32.67	BTS-330	
R18	10KΩ	½	32.11		
R19	47Ω	½	32.197		
R20	470Ω	½	32.173	BTS-470	
R21	100Ω	½	32.2	BTS-100	
R22	330Ω	½	32.67	BTS-330	
R23	100Ω	½	32.2	BTS-100	
R24	8200Ω	½	32.77	BTS-8200	
R25	47Ω	½	32.197		
R26	100Ω	½	32.2	BTS-100	
R27	5600Ω	½	32.126	BTS-5600	
R28	120Ω	½	32.118	BTS-120	
R29	10KΩ	½	32.11		
R30	5600Ω	½	32.126	BTS-5600	Note 1
R31	1Meg	½	32.33	BTS-1Meg	
R32	680KΩ	½	32.35	BTS-680K	
R33	1Meg	½	32.33	BTS-1Meg	
R34	39KΩ	½	32.103	BTA-39K	

RESISTORS (CONT.)

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: FADA PART No.	IRC PART No.	NOTES
R35	82Ω	½	32.125		Note 2
R36	39KΩ	2	32.660	BTB-39K	
R37	39KΩ	2	32.660	BTB-39K	
R38	82KΩ	½	32.412	BTS-82K	Note 3
R39	5000Ω	10	117.80	1 3/4A-5000	
R40	470KΩ	½	32.93	BTS-470K	
R41	330KΩ	½	32.205	BTS-330K	
R42	22KΩ	½	32.183	BTS-22K	
R43	47KΩ	½	32.15	BTS-47K	
R44	4700Ω	1	32.74	BTA-4700	
R45	330Ω	½	32.67	BTS-330	
R46	15KΩ	½	32.12	BTS-15K	
R47	22KΩ	½	32.13	BTS-22K	
R48	22KΩ	½	32.13	BTS-22K	
R49	10Meg	½	32.99	BTS-10Meg	
R50	220KΩ	½	32.18	BTS-220K	
R51	470KΩ	½	32.92	BTS-470K	
R52	680Ω	1	32.115	BTA-680	
R53	470Ω	1	32.399	BTA-470	
R54	33KΩ	1	32.14	BTB-33K	
R55	1.8Meg	½	32.208	BTS-1.8Meg	
R56	47KΩ	½	32.15	BTS-47K	
R57	10KΩ	½	32.11	BTS-10K	
R58	1.8Meg	½	32.208	BTS-1.8Meg	
R59	39KΩ	1	32.103	BTA-39K	
R60	6.8Meg	½	32.46	BTS-6.8Meg	
R61	1000Ω	½	32.8	BTS-1000	
R62	2200Ω	½	32.60	BTS-2200	
R63	2200Ω	½	32.60	BTS-2200	

RESISTORS (CONT.)

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: FADA PART No.	IRC PART No.	NOTES
R64	12KΩ	½	32.142	BTS-12K	
R65	68KΩ	1	32.411	BTA-68K	
R66A	22KΩ	½		BTS-22K	
B	8200Ω	½	♦167.1	BTS-8200	
C	8200Ω	½		BTS-8200	
R67	1.5Meg	½	32.147	BTS-1.5Meg	
R68	47KΩ	½	32.15	BTS-47K	
R69	1Meg	½	32.33	BTS-1Meg	
R70	2.2Meg	½	32.34	BTS-2.2Meg	
R71	47KΩ	½	32.15	BTS-47K	
R72	2.2Meg	½	32.34	BTS-2.2 Meg	
R73	330Ω	½	32.67	BTS-330	
R74	7500Ω	10	117.81	1 3/4A-7500	
R75	220KΩ	½	32.18	BTS-220K	
R76	220KΩ	½	32.18	BTS-220K	
R77	12KΩ	½	32.142	BTS-12K	
R78	100KΩ	½	32.89	BTS-100K	
R79	100KΩ	½	32.89	BTS-100K	
R80	4.7Meg	½	32.98	BTS-4.7Meg	
R81	470KΩ	½	32.92	BTS-470K	

RESISTORS (CONT.)

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: FADA PART No.	IRC PART No.	NOTES
R82	5600Ω	½	32.126	BTS-5600	
R83	1500Ω	½	32.265	BTS-1500	
R84	100KΩ	½	32.89	BTS-100K	
R85	150KΩ	½	32.90	BTS-150K	
R86	47KΩ	½	32.15	BTS-47K	
R87	15KΩ	2	32.665	BTB-15K	
R88	3900Ω	½	32.202	BTS-3900	
R89	100Ω	½	32.2		
R90	470KΩ	½	32.92	BTS-470K	
R91	100Ω	2	32.C35	BW-2-100	
R92	17.5KΩ	10	117.71	1 3/4A-17.5K	
R93	39KΩ	2	32.660	BTB-39K	
R94	6800Ω	½	32.10	BTS-6800	
R95	5.1Ω	½	32.137		
R96	100KΩ	1	32.373		
R97	500Ω	20	117.74	2D-500	
R98	500Ω	20	117.74	2D-500	
R99	500Ω	20	117.74	2D-500	
R100	2500Ω	25	117.83	4½-2500	
R101	100Ω	½	32.2	BTS-100	

♦ Items R66A, R66B, R66C, C61A, C61B, C61C are combined in one unit.
Note 1 Some models use a 8200Ω resistor in this application.
Note 2 Some models use a 120Ω resistor in this application.
Note 3 R38 is deleted when C3C is rated at 350 volts
Note 4 Note used in all models

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: FADA PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
T1	117VAC	710VCT	5VAC	5VAC	42.61 ①	P-8168	P-3059 ②	TP-360	R-37BC
	② 2.3A	.250ADC	② 6A	② 1.2A					
				SEC. 4					
				6.3VAC					
				② 8.7A					

① Drill new mtg. holes.
② Parallel both 5V windings.

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING: DC RESISTANCE PRI.	RATING: DC RESISTANCE SEC.	REPLACEMENT DATA: FADA PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	NOTES
T2	130Ω	1100Ω	42.53	A-8111	A-3000	TBO-1 ①	A-97X	Vert Osc Trans.
T3	31ΩTap ② 11Ω	10ΩTap ② .63Ω, 4.1Ω 9.3Ω	37.264					Horiz. Output Trans.
		SEC. #2 2Ω						
		SEC. #3 0Ω						
T4	1490ΩTap ② 5.3Ω		42.65	A-8141	A-3039		A-104X	Vert. Output Trans.
T5A	24Ω		37.265	MDF-70	DY-9	TY-3	Y-17	Horiz. Deflection Coils
B	48Ω							Vert. Deflection Coils

① Mount on top of chassis.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: FADA PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	NOTES
T6	4.5KΩ	3.7Ω	375Ω	.4Ω	42.57	A-3877	A-2930	RO-8	S-3X	

SPEAKER

ITEM No.	RATINGS: SIZE	RATINGS: FIELD	RATINGS: V. C. IMP.	REPLACEMENT DATA: FADA PART No.	REPLACEMENT DATA: JENSEN PART No.	REPLACEMENT DATA: QUAM PART No.	NOTES
SP1	9 3/4"	PM		C-18A19928	ST-745 Mod. F-10-S	10A31	

FILTER CHOKE

ITEM No.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D.C. RESISTANCE	RATINGS: INDUCTANCE (0 CURRENT 1000 ^L)	REPLACEMENT DATA: FADA PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
L1	.250A	60Ω	1.5HY	42.56	C-2326 ①	C-2996 ①	TR-1733 ①	C-17X ①

① Drill one new mtg. hole.

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA		NOTES
		PRI.	SEC.	FADA PART No.	MERIT PART No.	
L2	Ant. Coils	0Ω	0Ω			
L3	RF Choke	0Ω				
L4	Fil. Choke	0Ω				
L5	RF Mixer Grid & Osc. Coils	0Ω				
L6	Fil. Choke	0Ω				
L7	1st. Video IF	.8Ω				
L8	Fil. Choke					Not used in all models.
L9	Fil. Choke	0Ω		37.89		
L10	2nd. Video IF	.1Ω		37.99	TV-102 or TV-112	
L11	Fil. Choke	0Ω		37.89		
L12	RF Choke	1.6Ω		37.197		
L13	Sound Trap	0Ω		37.268		
L14	3rd. Video IF	.1Ω		37.99	TV-102 or TV-112	
L15	Fil. Choke	0Ω		37.89		
L16	RF Choke	1.6Ω		37.197		
L17	4th. Video IF	.1Ω		37.99	TV-102 or TV-112	
L18	Peaking Coil	4.4Ω		37.234		120 Microheneries
L19	Peaking Coil	12.5Ω		37.235	TV-188	600 Microheneries
L20	Peaking Coil	6.4Ω		37.236	*TV-184	Wound on 18K resistor 190 Microheneries
L21	Peaking Coil	7Ω		37.237	TV-185	245 Microheneries
L22	Sound Take-off	1.8Ω	1.8Ω	37.252	TV-113	
L23	Ratio Det.	5.3Ω	1.7ΩCT	37.253	TV-115	Tertiary winding .7Ω
L24	Horiz. Osc.	58Ω		37.233	TV-163	
L25	Width Coil	2.3Ω		37.248	MWC-2	
L26	Horiz. Lin.	5.4Ω		37.244		Tap @ 1.4Ω

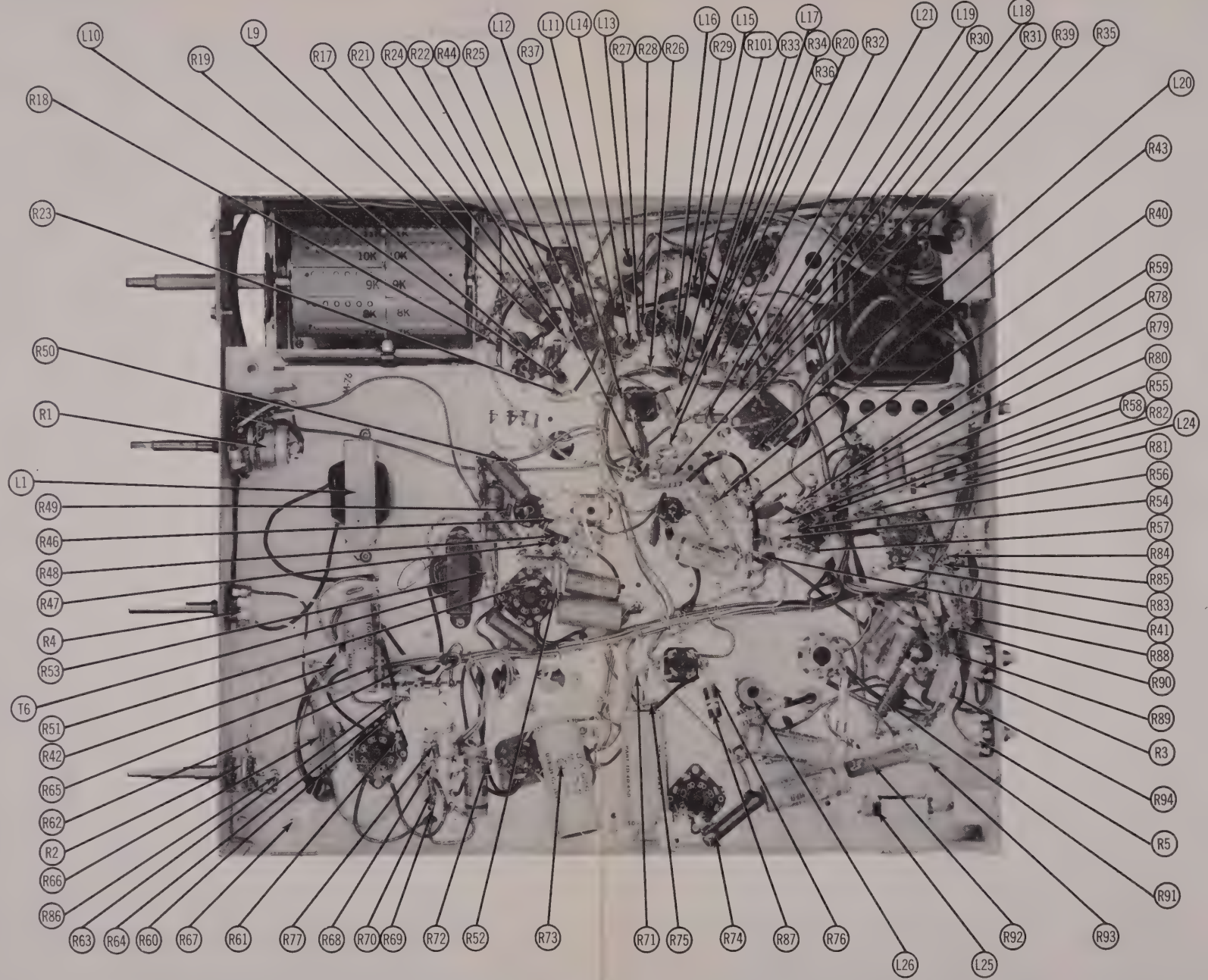
* Parallel with 18K resistor.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			FADA PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1		1/4A 250V.			318.250 (3AG-P/T)		GJV 1/4	

MISCELLANEOUS

ITEM No.	PART NAME	FADA PART No.	NOTES
M2	RF Tuner	42.71	
M3	Switch		AGC (Noise & Normal Area)
M4A	Focus Magnet	112.38	Model 20C22 & 24T10
M B	Focus Magnet	112.40	Model 20T12
M5 A	Ion Trap	112.30	Model 20T12 & 20C22
B	Ion Trap	112.23	Model 24T10
B2	Trimmer	132.18	Horiz. Drive (25-280MMF)
	Knob	142.77	Vert Hold, Contrast
	Knob	142.78	Off/On Volume, Horiz. Hold
	Knob	142.80	Channel Selector
	Knob	142.81	Fine Tuning
	Knob	157.39	Brightness
	Back Cover	97.431	Model 20T12
	Back Cover	97.379	Model 20C22
	Back Cover	97.460	Model 24T10
	Safety Glass	92.479	Model 20T12
	Safety Glass	92.403	Model 20C22
	Safety Glass	92.502	Model 24T10
	Escutcheon	92.381	Model 20T12
	Escutcheon	92.504	Model 20C22-24T10
	Spring	92.114	Escutcheon
	Mask	97.436G	Model 20T12
	Mask	97.399G	Model 20C22
	Mask	97.459	Model 24T10



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

FIRESTONE
MODEL 13-G-110 (Code 334-2-MS29A)

PROPERTY OF
L. F. BLANKENSHIP
3924 [illegible] ST.
DENVER, COLORADO

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MODEL 13-G-110

FIRESTONE
MODEL 13-G-110 (Code 334-2-MS29A)

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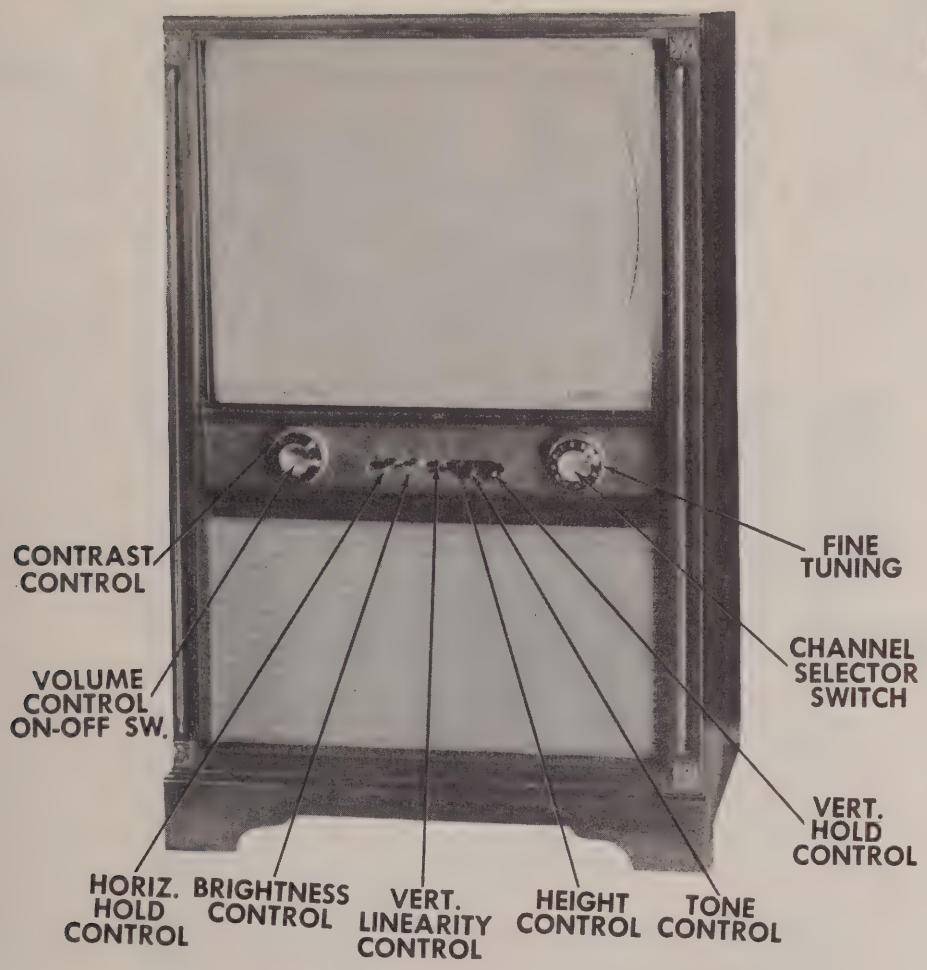
DATE 9-52 SET 180 FOLDER 4

FIRESTONE
MODEL 13-G-110 (Code 334-2-MS29A)



FIRESTONE
MODEL 13-G-110 (Code 334-2-MS29A)

TRADE NAME	Firestone Model 13-G-110 (code No. 334-2-MS29A)
SUPPLIER	Firestone Tire & Rubber Co., 1200 Firestone Parkway, Akron, Ohio
TYPE SET	Television Receiver
TUBES	Twenty-three
POWER SUPPLY	110-120 Volts AC-60 Cycle
RATING	1.9Amp. @ 117 Volts AC
TUNING RANGE— Channels	2 thru 13

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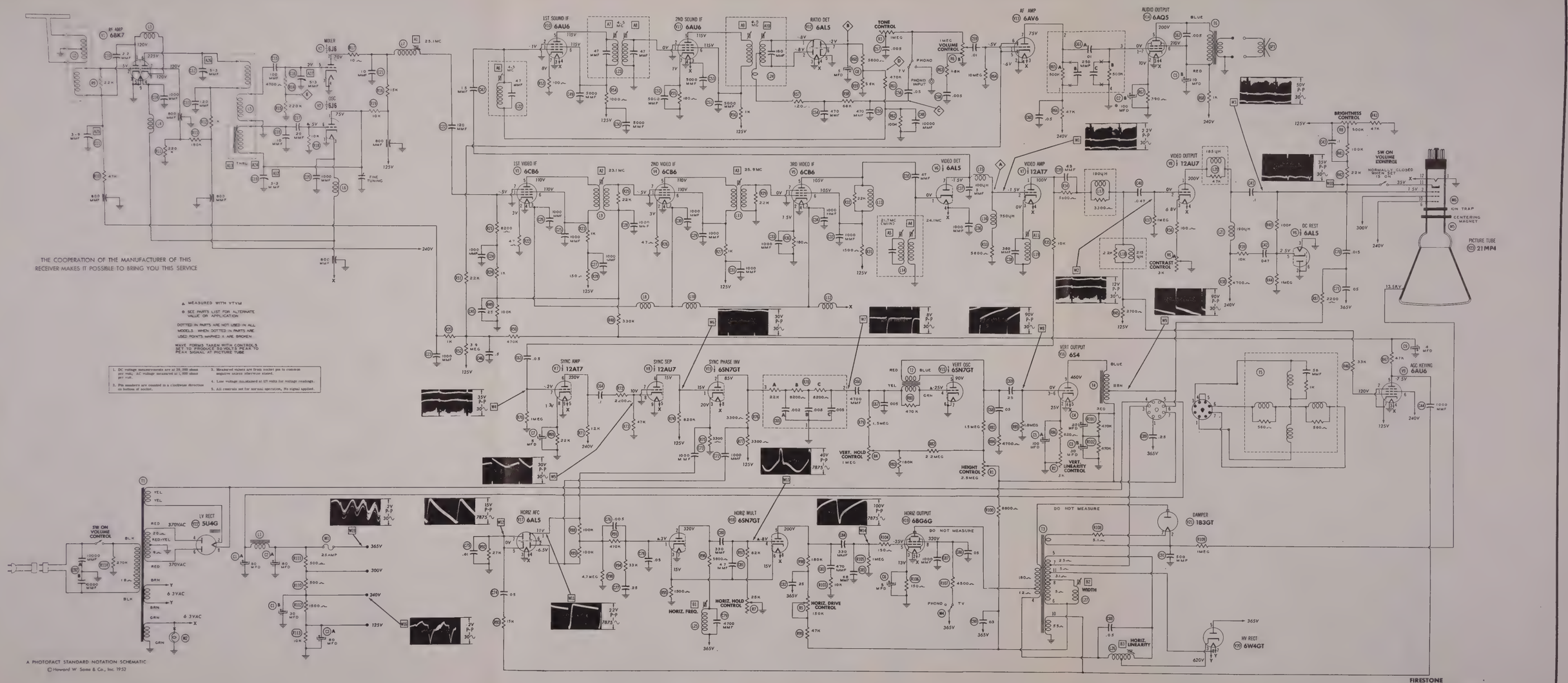
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
RF AMP 6BK7
MIXER 6J6
OSC 6J6
1ST SOUND IF 6AU6
2ND SOUND IF 6AU6
RATIO DET 6AL5
TONE CONTROL
VOLUME CONTROL
AF AMP 6AV6
AUDIO OUTPUT 6AQ5
1ST VIDEO IF 6CB6
2ND VIDEO IF 6CB6
3RD VIDEO IF 6CB6
VIDEO DET 6AL5
VIDEO AMP 12AT7
VIDEO OUTPUT 12AU7
BRIGHTNESS CONTROL
SW ON VOLUME CONTROL
NORMALLY CLOSED WHEN SET IS ON
DC REST 6AL5
CONTRAST CONTROL
ION TRAP
CENTERING MAGNET
PICTURE TUBE 21MP4
SYNC AMP 12AT7
SYNC SEP. 12AU7
SYNC PHASE INV 65N7GT
VERT OSC 65N7GT
VERT OUTPUT 6S4
VERT. HOLD CONTROL
HEIGHT CONTROL
VERT LINEARITY CONTROL
ACC KEYING 6AU6
SW ON VOLUME CONTROL
LV RECT 5U4G
HORIZ AFC 6AL5
HORIZ MULT 6SN7GT
HORIZ OUTPUT 6BG6G
DO NOT MEASURE
DAMPER 1B3GT
HORIZ. FREQ.
HORIZ. HOLD CONTROL
HORIZ. DRIVE CONTROL
WIDTH
HORIZ. LINEARITY
HV RECT 6W4GT
A MEASURED WITH VTVM
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DOTTED IN PARTS ARE NOT USED IN ALL MODELS. WHEN DOTTED IN PARTS ARE USED POINTS MARKED X ARE BROKEN.
WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 30 VOLTS PEAK TO PEAK SIGNAL AT PICTURE TUBE
1. DC voltage measurements are at 20,000 ohms per volt, AC voltage measured at 1,000 ohms per volt.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation, No signal applied.
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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FIRESTONE
MODEL 13-G-110 (Code 334-2-MS29A)

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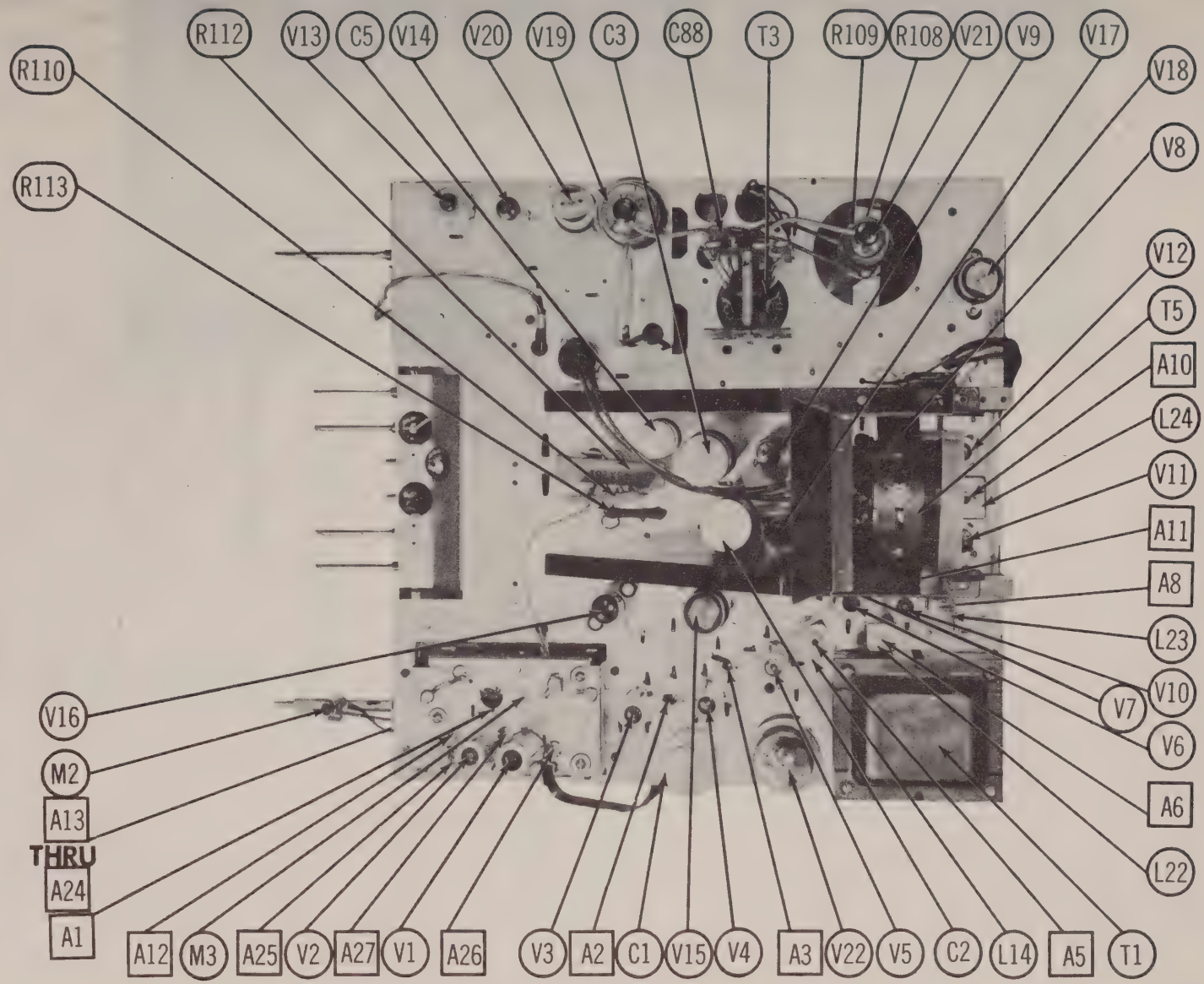
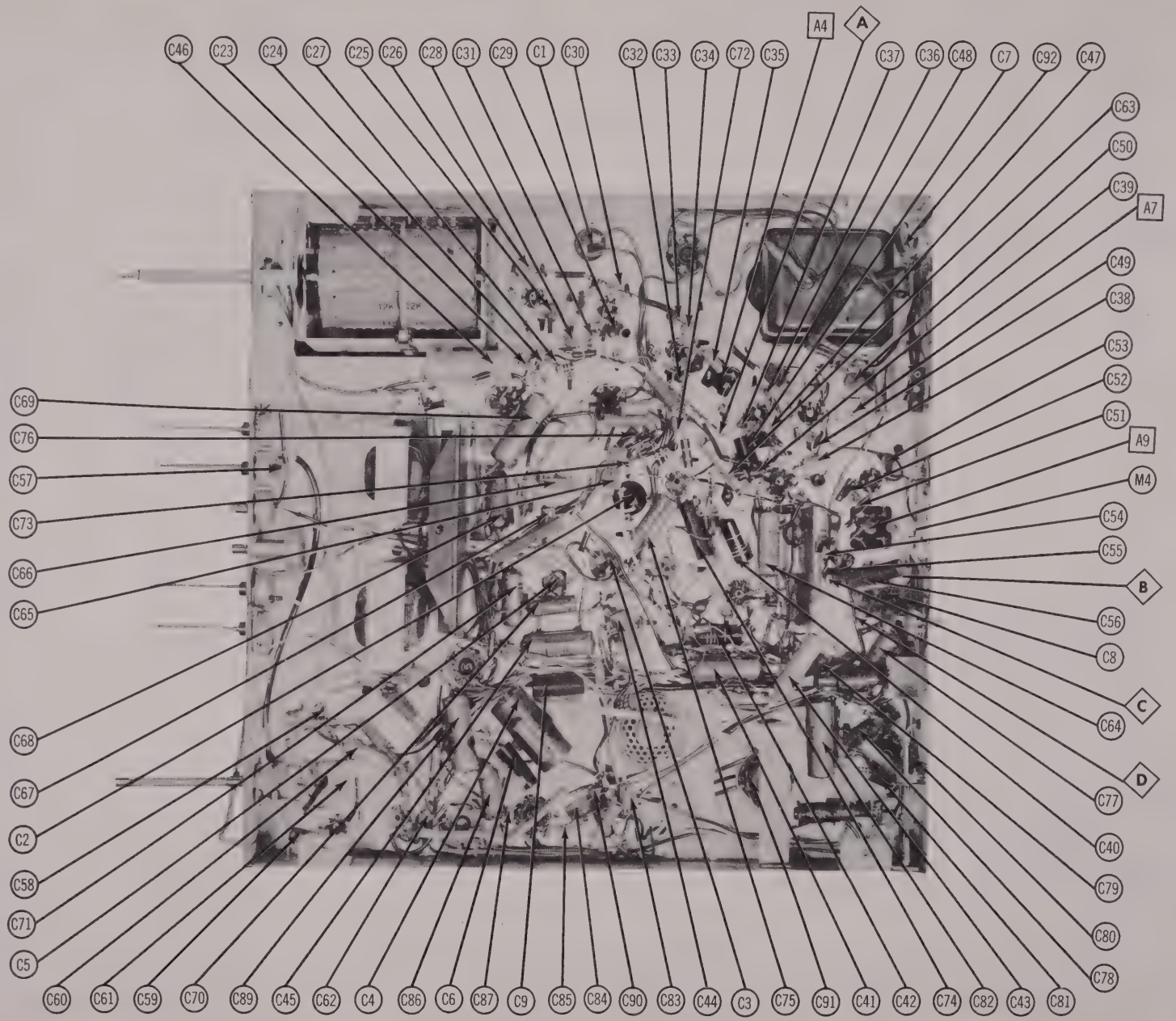
MODEL 13-G-110 (Code 334-2-MS29A)

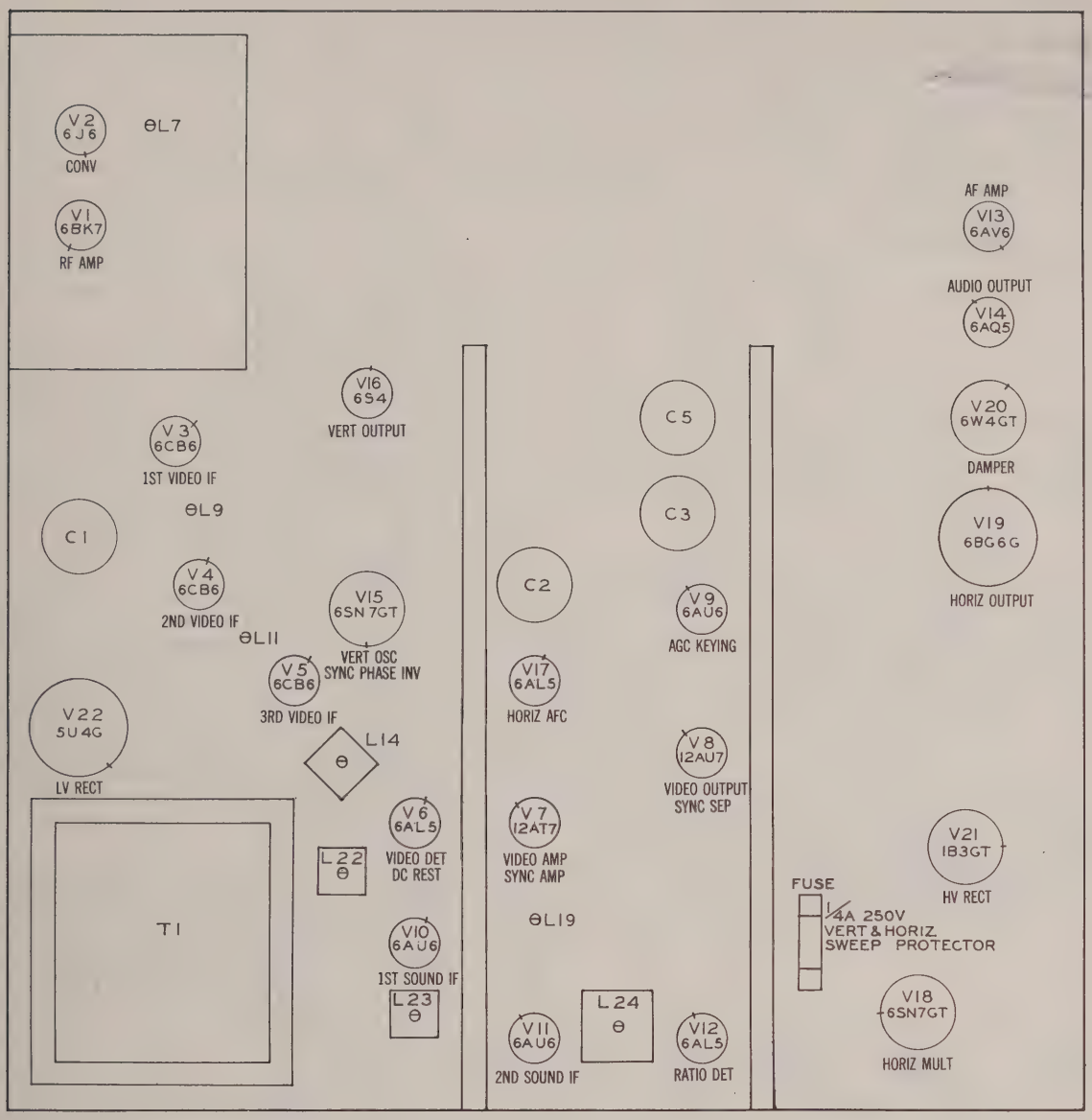


CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

TUBE PLACEMENT CHART



TOP VIEW

TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, No sound-V22

LOSS OF PICTURE OR SOUND
No pic, No sound, Has raster-V2, V3, V4, V5, V6
No pic, No sound, Has snow-V1, V2, V3
No pic, Has sound, Has raster-V6, V7, V8, V23
Has pic, No sound-V10, V11, V12, V13, V14
Overloaded picture-V9

SYNC FAILURE
No vert. sync.-V15
No hor. sync.-V15, V17, V18
No vert. or hor. sync.-V7, V8, V15

SWEEP FAILURE
No raster, has sound-V18, V19, V20, V21, V23, Fuse(M1)
No vertical deflection-V16
Poor vert. linearity or foldover-V15, V16
Poor horiz. linearity or foldover-V18, V19, V20
Narrow picture-V18, V19, V20, V21, V22
Vert. off freq.-V15
Horiz. off freq.-V15, V17, V18

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard can be eliminated by removing the horizontal multivibrator tube, V18.

VIDEO IF ALIGNMENT

Remove the converter tube, V2, from its socket and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications.
Connect the negative lead of a 3 volt battery to the ungrounded side of C45. Connect the positive lead to chassis.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube, V2. Low side to chassis.	25.1MC	Any	DC probe to point (A). Common to chassis.	A1	Adjust for maximum deflection.
2.	"	"	23.1MC	"	"	A2	"
3.	"	"	25.9MC	"	"	A3	"
4.	"	"	24.1MC	"	"	A4	"
5.	"	"	21.7MC	"	"	A5	Adjust for MINIMUM deflection.

OVERALL VIDEO IF RESPONSE CHECK

Leave bias battery connected as under Video IF Alignment.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	Direct	High side to an ungrounded tube shield floating over dummy converter tube V2. Low side to chassis.	24MC (10MC Swp)	21.7MC 23.MC 23.5MC 25.25MC 26.2MC	Any	Vert. amp. to point (A). Low side to chassis.		Check for response curve as per fig. 1 If necessary retouch A1 thru A4 for desired response.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Disable the sound AVC by connecting a short across C48.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
7.	.001MFD	High side to pin 1 (grid) of 6CB6 (V5). Low side to chassis.	4.5MC (Unmod.)	Any	DC probe to point (B). Common to chassis.	A6, A7, A8, A9	Adjust for maximum deflection.
8.	"	"	"	"	DC probe to point (C). Common to point (D).	A10	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	.001MFD	High side to pin 1 (Grid) of 6CB6 (V5). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. amp. to point (B). Low side to chassis.	A6, A7, A8, A9	Disconnect stabilizer capacitor C8. Adjust for curve of maximum amplitude and symmetry as per fig. 2.
8.	"	"	"	"	"	Vert. amp. to point (C). Low side to chassis.	A10	Reconnect capacitor C8. Adjust so that 4.5MC occurs at center of crossover lines as per fig. 3. SLIGHTLY retouch A9 for maximum amplitude and straightness of crossover lines.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	.001MFD	High side to pin 1 (grid) of 12AT7 (V7). Low side to chassis.	Not used	4.5MC (400~Mod.)	Any	Vert. amp. to pin 2 (grid) of picture tube. Low side to chassis.	All	Adjust for MINIMUM 400~ indication on scope.

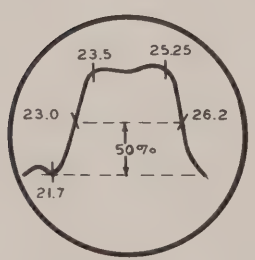


FIG.1

FIG.2

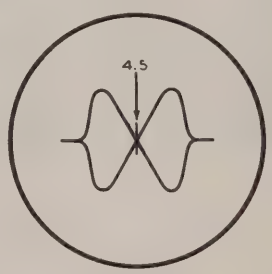


FIG. 3

ALIGNMENT INSTRUCTIONS (CONT.)

OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket.
Complete oscillator alignment may not be necessary.
If the oscillator seems to be off frequency approximately the same amount for a majority of the channels it may be possible to correct them in one step using A12. It should be noted that this is an all channel oscillator circuit adjustment and should not be used to correct for any individual channel. If adjustment of A12 will not bring all channels well within the range of the fine tuning control it will be necessary to adjust the channel strip adjustment for each channel that is off frequency. The channel adjustment screws are reached through a hole just to the right of the channel switch shaft. The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the signal generator to the horizontal uinput of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. amp. to point (A). Low side to chassis.	A13	Adjust to place sound marker in notch as per fig. 4. Video Marker should be at 50%.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A14	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A15	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A16	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A17	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A18	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A19	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A20	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A21	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A22	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A23	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A24	

RF ALIGNMENT

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Connect the negative lead of a 1.5 Volt battery to the junction of C11 and R9, positive lead to chassis.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
11.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	207MC (10MC Swp)	205.25MC 209.75MC	12	Vert. amp. thru 10KΩ to point (E). Low side to chassis.	A25, A26 A27	Adjust for response curve similar to fig. 5 with remarkers above 90%.
12.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		Check all channels for response similar to fig. 5. If markers fall below 70% on any channel make slight adjustments of A25, A26 and A27 with channel switch set for that channel. Recheck all channels to see that they have not been seriously affected.
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

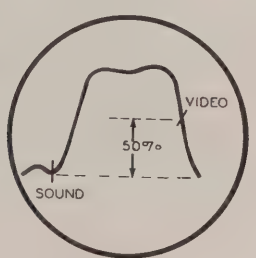


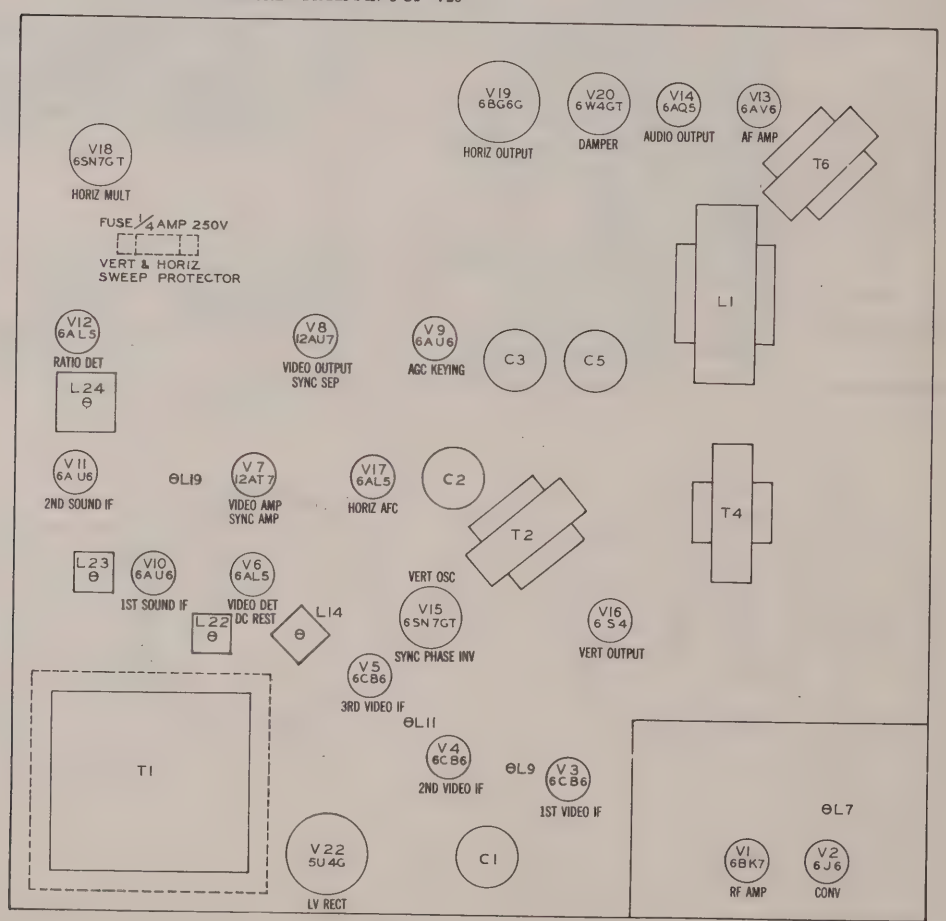
FIG.4

FIG.5

RESISTANCE MEASUREMENTS

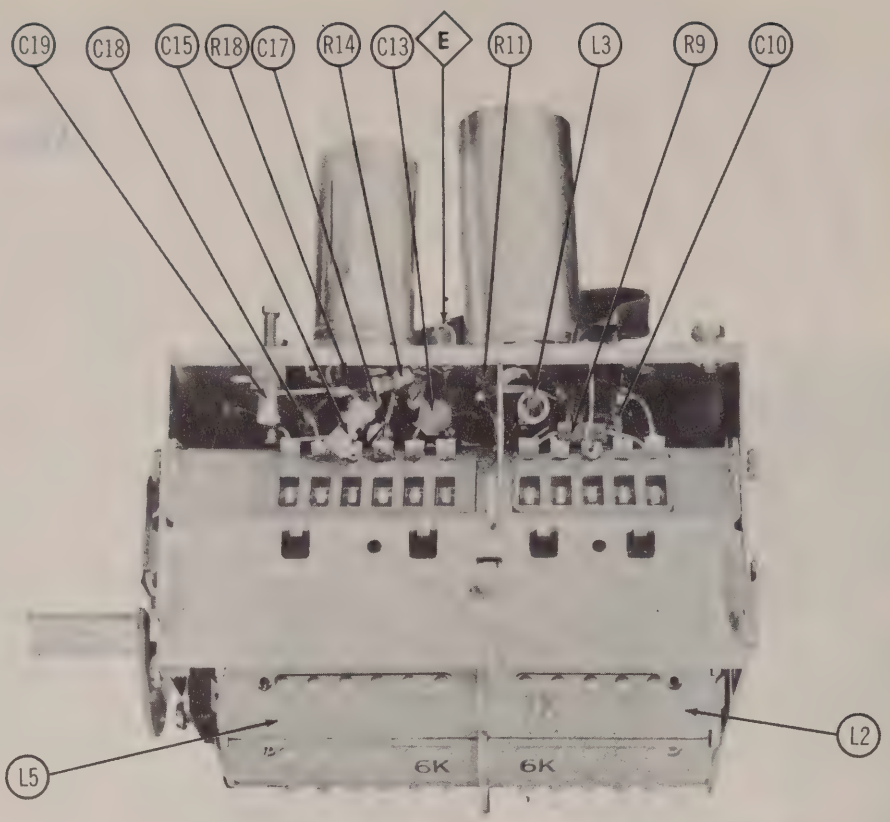
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BK7	INF	720KΩ	0Ω	.1Ω	0Ω	†2KΩ	†100KΩ	INF	0Ω
V 2	6J6	†12KΩ	†17KΩ	.1Ω	0Ω	220KΩ	10KΩ	0Ω		
V 3	6CB6	110KΩ	47Ω	.1Ω	0Ω	†3.7KΩ	†3.7KΩ	0Ω		
V 4	6CB6	100KΩ	47Ω	.1Ω	0Ω	†3.6KΩ	†3.6KΩ	0Ω		
V 5	6CB6	.2Ω	180Ω	.1Ω	0Ω	†4KΩ	†4KΩ	0Ω		
V 6	6AL5	.2Ω	0Ω	0Ω	.1Ω	1Meg	0Ω	5.6KΩ		
V 7	12AT7	†11KΩ	5.6KΩ	.2Ω	.1Ω	.1Ω	†13KΩ	1Meg	22KΩ	0Ω
V 8	12AU7	†5.7KΩ	1Meg	800Ω	.1Ω	.1Ω	†820KΩ	0Ω	47KΩ	0Ω
V 9	6AU6	†38KΩ	†2.5KΩ	0Ω	.1Ω	380KΩ	†1KΩ	†2.5KΩ		
V 10	6AU6	100KΩ	0Ω	0Ω	.1Ω	†3.5KΩ	†3.5KΩ	100Ω		
V 11	6AU6	1.7Ω	0Ω	.1Ω	0Ω	†3.5KΩ	†3.5KΩ	180Ω		
V 12	6AL5	INF	INF	0Ω	.1Ω	0Ω	INF	11KΩ		
V 13	6AV6	10Meg	0Ω	.1Ω	0Ω	700KΩ	700KΩ	†550KΩ		
V 14	6AQ5	500KΩ	390Ω	0Ω	.1Ω	†2.5KΩ	†2KΩ	500KΩ		
V 15	6SN7GT	†820KΩ	†9.1KΩ	3.3KΩ	2 Meg	#2Meg	0Ω	0Ω	.1Ω	
V 16	6S4	INF	1.2KΩ	1.8Meg	0Ω	.1Ω	1.8Meg	INF	INF	#7.8KΩ
V 17	6AL5	4.8Meg	4.8Meg	0Ω	.1Ω	27KΩ	INF	27KΩ		
V 18	6SN7GT	5.1Meg	†5.7KΩ	1.5KΩ	95KΩ	#310KΩ	.1.5KΩ	0Ω	.1Ω	
V 19	6BG6G	INF	0Ω	150Ω	†53Ω	1Meg	1Meg	.1Ω	†4.5KΩ	Top Cap #17Ω
V 20	6W4GT	INF	#6.8KΩ	350KΩ	INF	†53Ω	#12Ω	.#9Ω	#9Ω	
V 21	1B3GT	PIN 1–8 HAVE INF RESISTANCE								Top Cap #197Ω
V 22	5U4G	INF	10KΩ	INF	20Ω	INF	18Ω	INF	10KΩ	
V 23	21MP4	0Ω	1.1Meg	Pin 6 †1KΩ	Pin 10 †550Ω	Pin 11 220KΩ	Pin 12 .1Ω			

ALL CONTROLS SET FOR NORMAL OPERATION, NO SIGNAL APPLIED
† MEASURED FROM PIN 2 OF V22
# MEASURED FROM PIN 3 OF V20

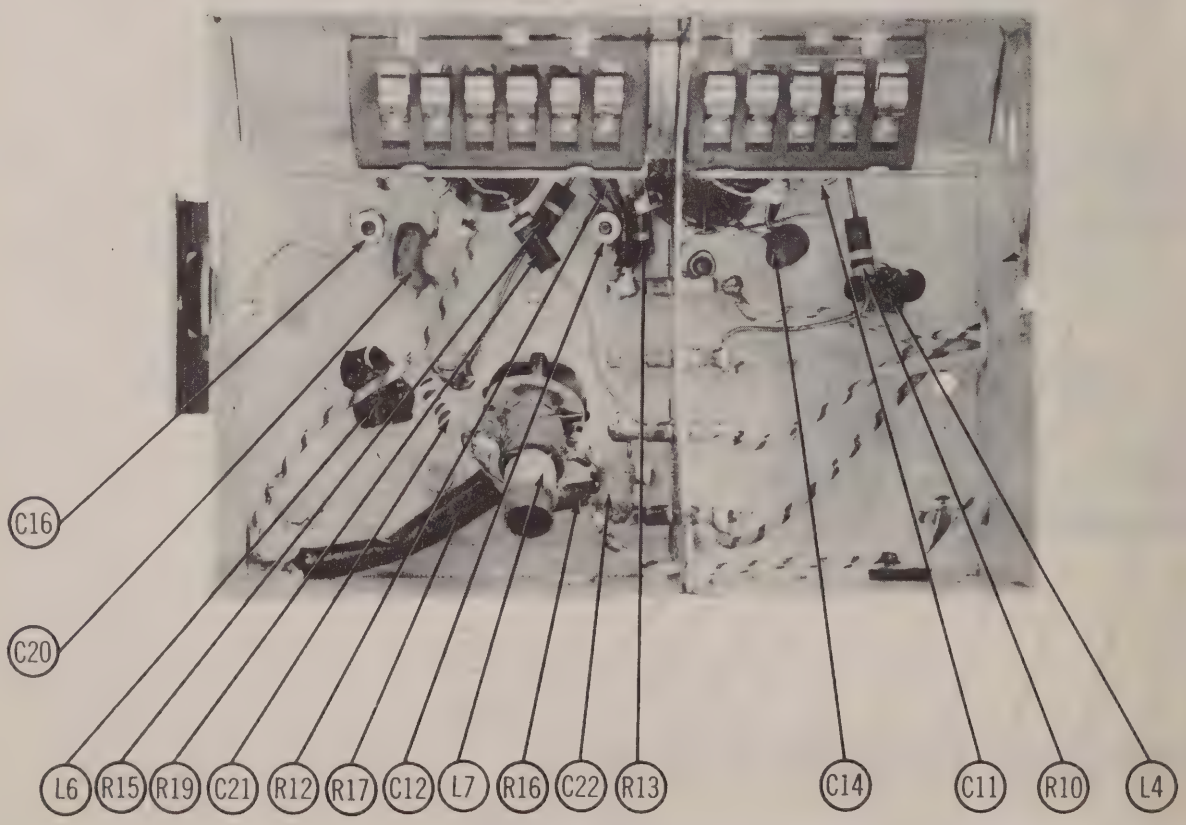


BOTTOM VIEW

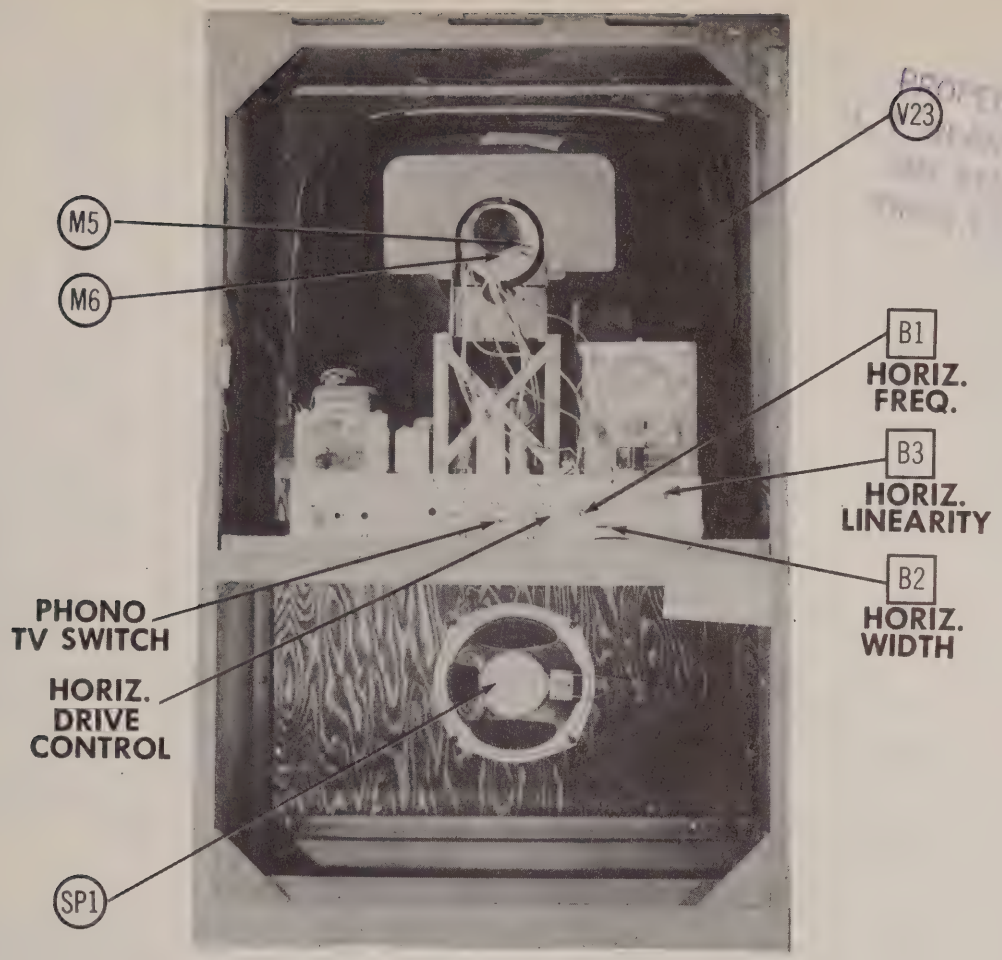
TUBE PLACEMENT CHART



RF TUNER-RIGHT SIDE



RF TUNER-BOTTOM VIEW



CABINET-REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Set the horizontal hold control at the middle of its range. Adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally.

Turn the horizontal drive control to its maximum clockwise position without the presence of a vertical white line or compression of the center of the picture.

Adjust the width slug (B2) for a picture slightly wider than enough to fill the picture mask.

Adjust the horizontal linearity slug (B3) for a picture that is symmetrical from left to right.

DISASSEMBLY INSTRUCTIONS

1. Remove 4 control knobs from front panel.
2. Remove 2 metal and 2 wood screws. Remove rear cover.
3. Disconnect built-in antenna and speaker.
4. Loosen 2 wood screws. Remove antenna bracket.
5. Remove 4 speaker nuts. Remove speaker.
6. Remove 5 chassis bolts. Remove chassis.

NOTE: FOR PICTURE TUBE REMOVAL IT IS NECESSARY TO REMOVE CHASSIS AS OUTLINED ABOVE.

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: FIRESTONE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V1	RF Amplifier	6BK7	6BK7	9AJ	
V2	Converter	6J6	6J6	TBF	
V3	1st. Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V6	Video Detector-DC Restorer	6AL5	6AL5	6BT	
V7	AF Amplifier-Sync Separator	12AT7	12AT7	9A	
V8	Video Amplifier-Sync Amplifier	12AU7	12AU7	9A	
V9	AGC Keying	6AU6	6AU6	7BK	
V10	1st. Sound IF Amp.	6AU6	6AU6	7BK	
V11	2nd. Sound IF Amp.	6AU6	6AU6	7BK	
V12	Ratio Detector	6AL5	6AL5	6BT	
V13	AF Amplifier	6AV6	6AV6	7BT	
V14	Audio Output	6AQ5	6AQ5	7BZ	
V15	Vert. Oscillator-Sync Phase Inv.	6SN7GT	6SN7GT	8BD	
V16	Vert. Output	6S4	6S4	9AC	
V17	Horiz. AFC	6AL5	6AL5	6BT	
V18	Horiz. Mult.	6SN7GT	6SN7GT	8BD	
V19	Horiz. Output	6BG6G	6BG6G	5BT	
V20	Damper	6W4GT	6W4GT	4CG	
V21	HV Rectifier	1B3GT	1B3GT	3C	
V22	LV Rectifier	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: FIRESTONE PART No.	REPLACEMENT DATA: SYLVANIA PART No.		RTMA BASE TYPE	NOTES
V23	21MP4			12C	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: FIRESTONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	▲80	450	45X376	AFH3-44		UP8445		FP377	TVL-2777	Note 1
B	▲30	450								
C2A	▲80	450	45X384	AFH4-8 7		UPT4445-V10		FP375	TVL-3764	
B	▲100	50								
C3A	▲ 80	450	45X376	AFH3-44		UP8445		FP377	TVL-2777	
B	▲30	450								
C4	20	450	45X382	PRS450/20		BR2045A		TC75	TVA-1709	
C5A	▲10	450	45X385	AFH3-156		UPT2150-V10		FP387	TVL-1705 TVA-1310	
B	▲100	50								
C6	5	25	45X378	PRS150/4		BR550		TC30	TVA-1203	
C7	5	25	45X378	PRS150/4		BR550		TC30	TVA-1203	
C8	5	25	45X378	PRS150/4		BR550		TC30	TVA-1203	
C9	4	100	45X361	PRS150/4		BR415	NP0K-2R2	TC40	TVA-1402	
C10	2.2		13D-167		TCZ-2.2				5TCCB-V22	
C11	3-9		31A-079		829-10			CT565A		
C12	.5-3		31A-069		829-3			CT565A		
C13	120		13D-045	SII20	D6-121	TMST12	GP2K-121	UC-5312	5GA-T12	
C14	1000		13D-041	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C15	100		13D-046	SII00	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C16	.5-3		31A-069		829-3			CT565A		
C17	20		13D-042	SI20NP0	TCZ-20		NP0K-200	ZT-542	5TCC-Q2	
C18	10		13D-064	SII0N750	TCN-10		N750K-100	NT-541	5TCU-Q1	
C19	.5-3		31A-069		829-3			CT565A		
C20	1000		13D-041	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C21	10		13D-053	SII0NP0	TCZ-10		NP0K-100	ZT-541	5TCC-Q1	
C22	120		13D-045	SII20	D6-121	TM5T12	GP2K-121	UC-5312	5GA-T12	
C23	1000		47X519	SII000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C24	1000		47X519	SII000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C25	1000		47X519	SII000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C26	1000		47X519	SII000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C27	1000		47X519	SII000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C28	1000		47X519	SII000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C29	1000		47X519	SII000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C30	1000		47X519	SII000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C31	1000		47X519	SII000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C32	1000		47X519	SII000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C33	1000		47X519	SII000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C34	1000		47X519	SII000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C35	47	500	47X565	1469-00005	TCZ-47	5R5Q5	NP0L-470	MCB225	MS-45	
C36	1000		47X519	SII000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C37	5		47X562	SI5NP0	TCZ-4.7		NP0K-050	ZT-555	5TCCB-V47	
C38	360	500	47X588							
C39	43		47X563							
C40	.047	400	46X397	P488-047	DF-503	PTE4S47		PT4147	4TM-S47	
C41	.1	600	46X403	P688-1	DF-104	PTE6P1		PT601	6TM-P1	
C42	.047	400	46X397	P488-047	DF-503	PTE4S47		PT4147	4TM-S47	
C43	.1	200	B65104	P288-1	DF-104	PJ2P1		PT401	2TM-P1	
C44	1000	1000	47X569	1467L-HV-001				MCK210		
C45	.25	200	B65254	P488-25				PT4025	2TM-P25	
C46	.5	200	B65504	P288-5				PT405	2TM-P5	
C47	1.5		47X594	SII.5NP0	TCZ-1.5		NP0K-1R5	ZT-5515	5TCCB-V15	
C48	10000		47X595	BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C49	5000		47X507	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C50	5000		47X507	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C51	5000		47X507	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C52	5000		47X507	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C53	5000		47X507	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C54	470	500	47X525	1469-0005		5R5T5		MCB245	MS-35	
C55	470	500	47X525	1469-0005		5R5T5		MCB245	MS-35	
C56	.05	200	B65503	P288-05	DF-503	PJ2S5		PT415	2TM-S5	

CAPACITORS (CONT.)

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: FIRESTONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C57	.005	400	D65502	P688-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5	
C58	.005	200	B65502	P688-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5	
C59	.01	200	B65103	P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C60	.05	400	D65503	P488-05	DF-503	PTE4S5		PT415	4TM-S5	
C61A	.01									
B	250		†76X5		†PC-80		†1404-01		†102C1	
C										
C62	.005	600	F65502	P688-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5	
C63	.05	400	D65503	P488-05	DF-503	PTE4S5		PT415	4TM-S5	
C64	.1	400	D65104	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C65A	.002			P688-002		PTE6D2		PT622		
B	.005		♦76X7	P688-005	♦PC-100	PTE6D5	♦1405-01	PT625	♦101C1	
C	.005			P688-005		PTE6D5		PT625		
C66	4700	500	47X543	1464-005		1DR5D5		MCB465	MS-25	
C67	.005	200	B65502	P688-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5	
C68	.05	600	F65503	P688-05	DF-503	PTE6S5		PT615	6TM-S5	
C69	.25	400	D65254	P488-25		PTE4P25		PT4025	4TM-P25	
C70	.015	600	F65153	P688-015		PTE6S15			6TM-S15	
C71	.05	600	F65503	P688-05	DF-503	PTE6S5		PT615	6TM-S5	
C72	1000		47X519	SII000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C73	1000		47X519	SII000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C74	.05	200	B65503	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C75	.01	400	B65103	P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C76	.005	200	B65502	P688-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5	
C77	.25	200	B65254	P488-25				PT4025	2TM-P25	
C78	.05	400	B65503	P488-05	DF-503	PTE4S5		PT415	4TM-S5	
C79	4700	500	47X543	1464-005		1DR5D5		MCB465	MS-25	
C80	330	500	47X570	1469-00035						
C81	47	500	47X565	1469-00005		5R5Q5		MCB225	MS-45	
C82	.25	400	D65254	P488-25		PTE4P25		PT4025	4TM-P25	
C83	470	500	47X525	1469-0005		5R5T5		MCB245	MS-35	
C84	330	500	47X570	1469-00035						
C85	68		47X599		TCZ-68		NP0-333-680		5TCC-Q68	
C86	.05	600	F65503	P688-05	DF-503	PTE6S5		PT615	6TM-S5	
C87	1000		47X519	SII000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C88	.05	400	D65503	P488-05		PTE4S5		PT415	4TM-S5	
C89	.25	400	D65254	P488-25		PTE4P25		PT4025	4TM-P25	
C90	.03	400	D65303	P488-03		PTE6S3		PT413	6TM-S3	
C91	500	20000	47X560	HV20C	TV3-502	MM-C20TS	413-501		20DK-T5	
C92A	10000		†76X8	BPD-01	DD-3-103	TM5S1	821-01	DC-511	5HK-2S1	
B	10000			BPD-01		TM5S1	821-01	DC-511		

Note 1. Some models use 40MFD in this application.
♦ Items C65A, C65B, C65C, R78A, R78B, R78C are combined in one unit.
† Items C61A, C61B, C61C, R65A, R65B are combined in one unit.
When replacing items separately C61B and C61C should total 250MMF

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: FIRESTONE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	2.5Meg	½	40X293C	Q11-239	AG-84-S	AB-83	SU-565	Height
B	Shaft		Not Req.	SQ	FK8-1/4	AK-1	Not Req.	Attach to R1A
R2A	5000Ω	½	40X294D	Q11-114 **	AG-19-S **		U14 **	Vert Linearity
B	Shaft		Not Req.	Not Req.	RS-2		Not Req.	Attach to R2A
C	Bushibg		Not Req.	S3	59-186		EB247	Attach to R2A
R3A	1 Meg	½	B40X334-D	Q11-137	AG-61-S	AB-69	U-54	Tone
B	Shaft		Not Req.	Not Req.	RS-3/16	AK-4	Not Req.	Attach to R3A
R4A	1 Meg	½	B40X334-D	Q11-137	AG-61-S	AB-69	U-54	Vert Hold
B	Shaft		Not Req.	Not Req.	RS-3/16	AK-4	Not Req.	Attach to R4A
R5A	150KΩ	½	B40X331-A	Q11-129	AG-52-S	AB-46	U-43	Horiz. Drive
B	Shaft		Not Req.	Not Req.	FK8-1/4	AK-1	Not Req.	Attach to R5A
R6A	3000Ω	½	78X9	QJ337 *				Contrast-Panal
B	1 Meg							Volume-Tapped @ 200KΩ-Rear
R7A	25KΩ	½	B40X336-A	Q11-120	AG-40-S	AB-26	U-29	Horiz. Hold
B	Shaft		Not Req.	Not Req.	RS-3/16	AK-4	Not Req.	Attach to R7A
R8A	500KΩ	½	B40X333-A	Q11-133	AG-58-S	AB-59	U-50	Brightness
B	Shaft		Not Req.	Not Req.	RS-3/16	AK-4	Not Req.	Attach to R8A

* CONCENTRIKIT EQUIVALENT-KIT K-2, BASE ELEMENTS & SHAFTS, B17-112 & P1-310 (panel) B13-137X & R2-322 (rear) & SWITCH 76-2.

** FASHION SHAFT TO DUPLICATE ORIGINAL.

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: FIRESTONE PART No.	IRC PART No.	NOTES
R9	22KΩ	½	12A-118		
R10	47KΩ	½	12A-039		
R11	220KΩ	½	12A-041	BTS-220K	
R12	1000Ω	½	12A-027	BTS-1000	
R13	180KΩ-5%	½	12A-153	BTS-180K-5%	
R14	4700Ω	½	12A-042	BTS-4700	
R15	220KΩ	½	12A-041	BTS-220K	
R16	15KΩ	½	12A-021	BTS-15K	
R17	10Ω	½	12A-150		
R18	10KΩ	½	12A-040	BTS-10K	
R19	10KΩ	½	12A-040	BTS-10K	
R20	1000Ω	½	B85102	BTS-1000	
R21	8200Ω	½	B83822		
R23	470-5%	½	B83470		
R23	1000Ω	½	B85102	BTS-1000	
R24	1000Ω	½	B85102	BTS-1000	
R25	22KΩ	½	B83223	BTS-22K	
R26	47Ω-5%	½	B83470		
R27	1000Ω	½	B85102	BTS-1000	
R28	150Ω	½	B84151	BTS-150	
R29	22KΩ	½	B83223	BTS-22K	
R30	180Ω	½	B84181	BTS-180	
R31	1500Ω	½	B85152	BTS-1500	
R32	22KΩ	½	B84223	BTS-22K	
R33	5600Ω	½	B83562	BTS-5600	
R34	5600Ω	1	C84562	BTA-5600	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: FIRESTONE PART No.	IRC PART No.	NOTES
R35	10KΩ	½	B84103	BTS-10K	
R36	100Ω	½	B84101	BTS-100	
R37	1Meg	½	B85105	BTS-1Meg	
R38	47000Ω-5%	1	C83472	BTA-4700-5%	
R39	10KΩ	½	B84103	BTS-10K	
R40	100KΩ	½	B85104	BTS-100K	
R41	100KΩ	½	B85104	BTS-100K	
R42	22KΩ	½	B85223	BTS-22K	
R43	47KΩ	½	B85473	BTS-47K	
R44	1 Meg	½	B85105	BTS-1 Meg	
R45	2700Ω-5%	1	C83272	BTA-2700-5%	
R46	33KΩ	½	B84333	BTS-33K	
R47	47KΩ	½	B84473	BTS-47K	
R48	330KΩ-5%	½	B84334	BTS-330K-5%	
R49	100KΩ	½	B84102	BTS-100K	
R50	470KΩ	½	B85474	BTS-470K	
R51	22KΩ	½	B84223	BTS-22K	
R52	3.9Meg	½	B84395	BTS-3.9Meg	
R53	100Ω	½	B84101	BTS-100	
R54	1000Ω	½	B85102	BTS-1000	
R55	180Ω	½	B85181	BTS-180	
R56	1000Ω	½	B85102	BTS-1000	
R57	120Ω	½	B84121	BTS-120	
R58	68KΩ	½	B84683	BTS-68K	
R59	5600Ω	½	B84562	BTS-5600	
R60	5600Ω	½	B84562	BTS-5600	

RESISTORS (CONT.)

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: FIRESTONE PART No.	IRC PART No.	NOTES
R61	470KΩ	½	B84474	BTS-470K	
R62	100KΩ	½	B84104	BTS-100K	
R63	68KΩ	½	B84683	BTS-68K	
R64	10 Meg	½	B85106	BTS-10Meg	
R65A	500KΩ	½	†76X5		
B	500KΩ	½			
R66	47KΩ	½	B85473	BTS-47K	
R67	390Ω	1	C84391	BTA-390	
R68	1000Ω	2	D84102	BTB-1000	
R69	22KΩ	½	B84223	BTS-22K	
R70	1Meg	½	B85105	BTS-1Meg	
R71	12KΩ	½	B84123	BTS-12K	
R72	2200Ω	½	B84222	BTS-2200	
R73	47KΩ	½	B84473	BTS-47K	
R74	820KΩ	½	B84824	BTS-820K	
R75	3300Ω	½	B83332	BTS-3300	
R76	3300Ω	½	B84332	BTS-3300	
R77	3300Ω	½	B83332	BTS-3300	
R78A	22KΩ	½	♦76X7	BTS-22K	
B	8200Ω	½		BTS-8200	
C	8200Ω	½		BTS-8200	
R79	1.5Meg	½	B84155	BTS-1.5Meg	
R80	470KΩ	½	B85474	BTS-470K	
R81	1.5Meg	½	B84155	BTS-1.5Meg	
R82	2.2Meg	½	B84225	BTS-2.2Meg	
R83	180KΩ	½	B84184	BTS-180K	
R84	4700Ω	½	B84472	BTS-4700	
R85	1.8Meg	½	B84185	BTS-1.8Meg	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: FIRESTONE PART No.	IRC PART No.	NOTES
R86	820Ω	½	RB482J	BTS-820	
R87	2200Ω	½	B85222	BTS-2200	
R88	100KΩ	½	B84104	BTS-100K	
R89	100KΩ	½	B84104	BTS-100K	
R90	4.7Meg	½	B85475	BTS-4.7Meg	
R91	470KΩ	½	B85474	BTS-470K	
R92	27KΩ	½	B84273	BTS-27K	
R93	15KΩ	1	C84153	BTA-15K	
R94	33KΩ	½	B84333	BTS-33K	
R95	1500Ω	½	B84152	BTS-1500	
R96	5600Ω	½	B84562	BTS-5600	
R97	82KΩ	½	B84823	BTS-82K	
R98	180KΩ	½	B84184	BTS-180K	
R99	47KΩ	½	B84473	BTS-47K	
R100	6800Ω	5	43X266	1 3/4A-7000	
R101	470KΩ	½	B84474	BTS-470K	
R102	470KΩ	½	B84474	BTS-470K	
R103	10KΩ	½	B84103	BTS-10K	
R104	150Ω	½	B84151		
R105	1 Meg	½	B84105	BTS-1 Meg	
R106	150Ω	5	43X263	1 3/4A-150	
R107	4500Ω	5	42X268	1 3/4A-4500	
R108	5.10	½	43X239		
R109	1 Meg	1	C85105		
R110	500Ω	10	43X245	1 3/4A-500	
R111	500Ω	10	43X245	1 3/4A-500	
R112	1500Ω	5	43X261	1 3/4A-1500	
R113	10KΩ	5	43X247	1 3/4A-10K	
R114	270KΩ	½	B85274	BTS-270K	

† Items R65A, R65B, C61A, C61B, C61C are combined in one unit.
♦ Items R78A, R78B, R78C C65A, C65B, C65C are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: FIRESTONE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
T1	117VAC @ 1.9A	745VCT .240ADC	5VAC @ 3A	6.3VAC @ 8.5A SEC. 4 6.3VAC @ 2.26A	53X318	P-8169	P-3067	TP-356	

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING: DC RESISTANCE PRI.	RATING: DC RESISTANCE SEC.	REPLACEMENT DATA: FIRESTONE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	NOTES
T2	250Ω	1160Ω	54X7	A-8125	A-3000 ①	TBO-2 ②	A-97X	Vert. osc. trans.
T3	192Ω Tap @ 12Ω	11.1Ω Tap @ .5Ω, 3.6Ω, 8.6Ω SEC. 2 5.5Ω SEC. 3 0Ω	53X319					Horiz. Output Trans.
T4	1063Ω		51X151	A-8123	A-3037	TSO-8	A-102X	Vert. Output Trans.
T5A	Tap @ 12.7Ω 18Ω		9A2257	DY-9	MDF-70	TY-3	Y-17	Horiz. Deflection Coils
B	57Ω							Vert. Deflection Coils

① Drill one new mtg. hole
② Mount on top of chassis.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: FIRESTONE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	NOTES
T6	5.8KΩ	3.2Ω	495Ω	.9Ω	51X150A	A-3850	A-2931	RO-301	S-3X	① Drill one new mtg. hole.

SPEAKER

ITEM No.	RATINGS: SIZE	RATINGS: FIELD	RATINGS: V. C. IMP.	REPLACEMENT DATA: FIRESTONE PART No.	JENSEN PART No.	QUAM PART No.	NOTES
SP1	8"	PM	3.3Ω	12A305 12A477 ①	ST-115 Mod. P8-V	8A21	① Alternate 8"PM speaker

FILTER CHOKE

ITEM No.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D. C. RESISTANCE	RATINGS: INDUCTANCE (0 CURRENT 1000 ∿)	REPLACEMENT DATA: FIRESTONE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
L1	.215A	53Ω	2.1 Hy.	52X88A	C-2326	C-2991	TR-3300 ①	C-4X

① Drill one new mtg. hole.

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA FIRESTONE PART No.	REPLACEMENT DATA MERIT PART No.	NOTES
L2	Ant. Coils	0Ω	0Ω	9A2231		Channel 2
L3	RF Choke	0Ω		34A-574		
L4	Fil. Choke	0Ω		34A-546		
L5	RF Mixer Grid & Osc. Coil	0Ω		9A2243		Channel 2
L6	Fil. Choke	0Ω		34A-546		
L7	1st. Video IF	.8Ω		31A-078	TV-112	
L8	Fil. Choke	0Ω		9A2033		
L9	2nd. Video IF	.2Ω	.2Ω	9A2230		
L10	Fil. Choke	0Ω		9A2033		
L11	3rd. Video IF	.2Ω	.2Ω	9A2230		
L12	Fil. Choke	0Ω		9A2033		
L13	RF Choke	2.6Ω		9A1979		
L14	4th. Video IF	.2Ω		9A2226	TV-101	Includes Trap
L15	Peaking Coil	9.8Ω		36A1	TV-181	100 Microhenries
L16	Peaking Coil	33Ω		36A5		750 Microhenries
L17	Peaking Coil	14Ω		36A9	† TV-184	190 Microhenries wound on 3.3KΩ resistor
L18	Peaking Coil	14.5Ω		36A4		215 Microhenries wound on 2.2KΩ resistor
L19	4.5MC Trap	.2Ω		9A2074	TV-151	
L20	Peaking Coil	14Ω		36A8	* TV-184	185 Microhenries wound on 47KΩ resistor
L21	Peaking Coil	14Ω		36A2	TV-184	190 Microhenries
L22	1st. Sound IF	2.7Ω		9A2168		
L23	2nd. Sound IF	1.6Ω	1.7Ω	9A2170	TV-113	
L24	Ratio Det.	2.6Ω	4Ω CT	9A2171	TV-110	Tertiary .4Ω
L25	Horiz. Osc.	50Ω		9A2096	TV-163	
L26	Horiz. Lin.	6.5Ω		9A2172		Tap @ 1.5Ω
L27	Width Coil	.6Ω		9A2183		

* Parallel with 47KΩ resistor
† Parallel with 3.3KΩ resistor

FUSES

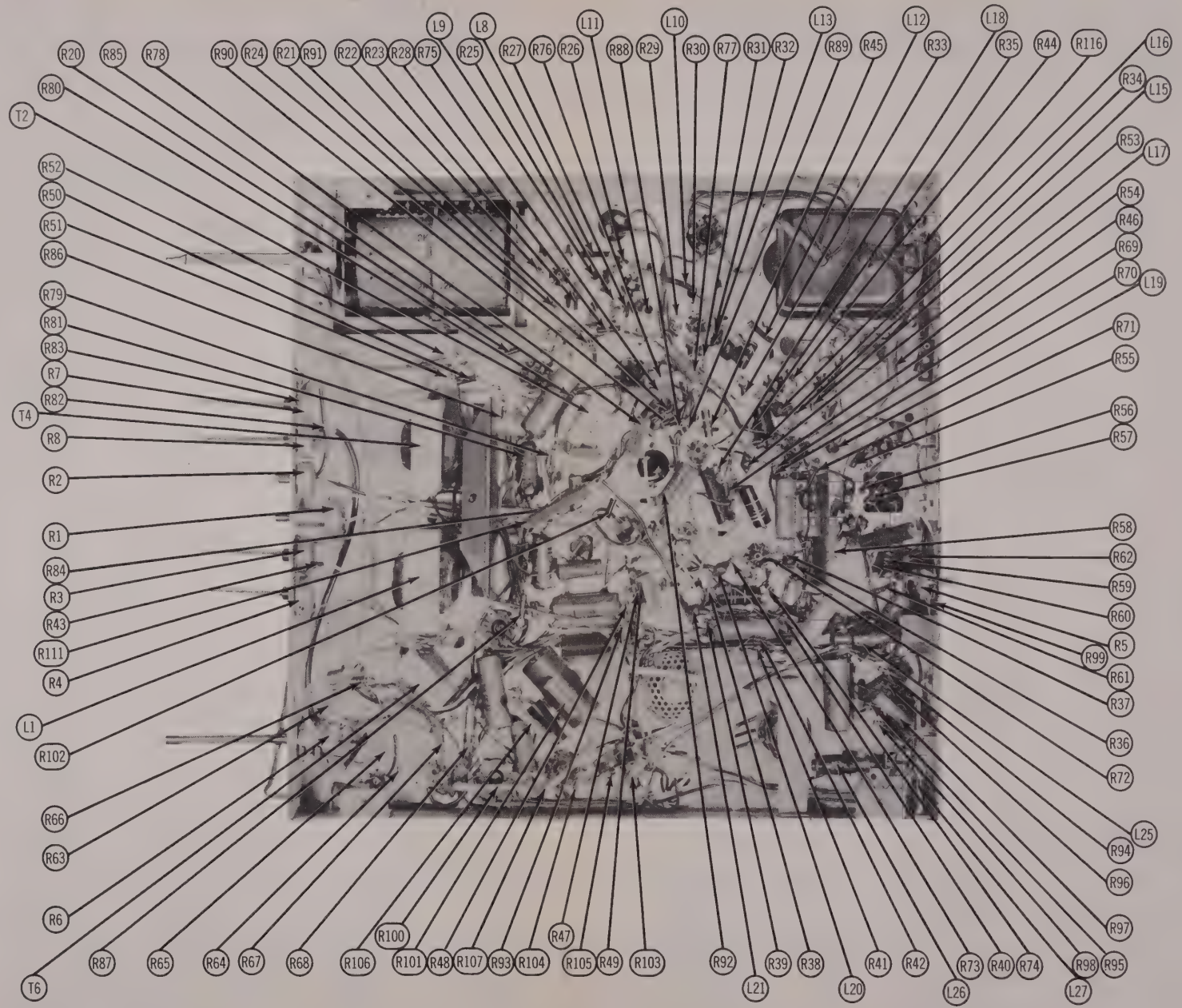
ITEM No.	TYPE	RATING	REPLACEMENT DATA FIRESTONE PART No. FUSE	FIRESTONE PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3AG	1/4A 125V	16X147	16X146	313.250	357001	MDL 1/4A	4405

MISCELLANEOUS

ITEM No.	PART NAME	FIRESTONE PART No.	NOTES
M3	RF Tuner	25A1088	
M4	Switch	3A402	
M5	Centering Magnet	2A419	
M6	Ion Trap	2A407	
	Ant. Coil	9A2232	Channel #3
	Ant. Coil	9A2233	Channel #4
	Ant. Coil	9A2234	Channel #5
	Ant. Coil	9A2235	Channel #6
	Ant. Coil	9A2236	Channel #7
	Ant. Coil	9A2237	Channel #8
	Ant. Coil	9A2238	Channel #9
	Ant. Coil	9A2239	Channel #10
	Ant. Coil	9A2240	Channel #11
	Ant. Coil	9A2241	Channel #12
	Ant. Coil	9A2242	Channel #13
	RF, Mixer Grid & Osc. Coil	9A2244	Channel #3
	RF, Mixer Grid & Osc. Coil	9A2245	Channel #4
	RF, Mixer Grid & Osc. Coil	9A2246	Channel #5
	RF, Mixer Grid & Osc. Coil	9A2247	Channel #6
	RF, Mixer Grid & Osc. Coil	9A2248	Channel #7
	RF, Mixer Grid & Osc. Coil	9A2249	Channel #8
	RF, Mixer Grid & Osc. Coil	9A2250	Channel #9
	RF, Mixer Grid & Osc. Coil	9A2251	Channel #10
	RF, Mixer Grid & Osc. Coil	9A2252	Channel #11
	RF, Mixer Grid & Osc. Coil	9A2253	Channel #12
	RF, Mixer Grid & Osc. Coil	9A2254	Channel #13
	Knob	10A778	Channel Selector
	Knob	10A785	Fine Tuning
	Knob	10A786	Contrast
	Knob	10A779	On/Off Volume
	Escutcheon	S-4X18	Control Door Assembly
	Mask	4X1180	
	Safety Glass	17X160	
	Cabinet Back	S-14X56	Includes Power Cord

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA FIRESTONE PART No.	REPLACEMENT DATA	NOTES
M2	Bayonet	7.5	.2	White	7A32		Type #51



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

PHOTOFACT* Folder

GENERAL ELECTRIC MODELS 17C110, 17C111 (Early & "W" Versions)

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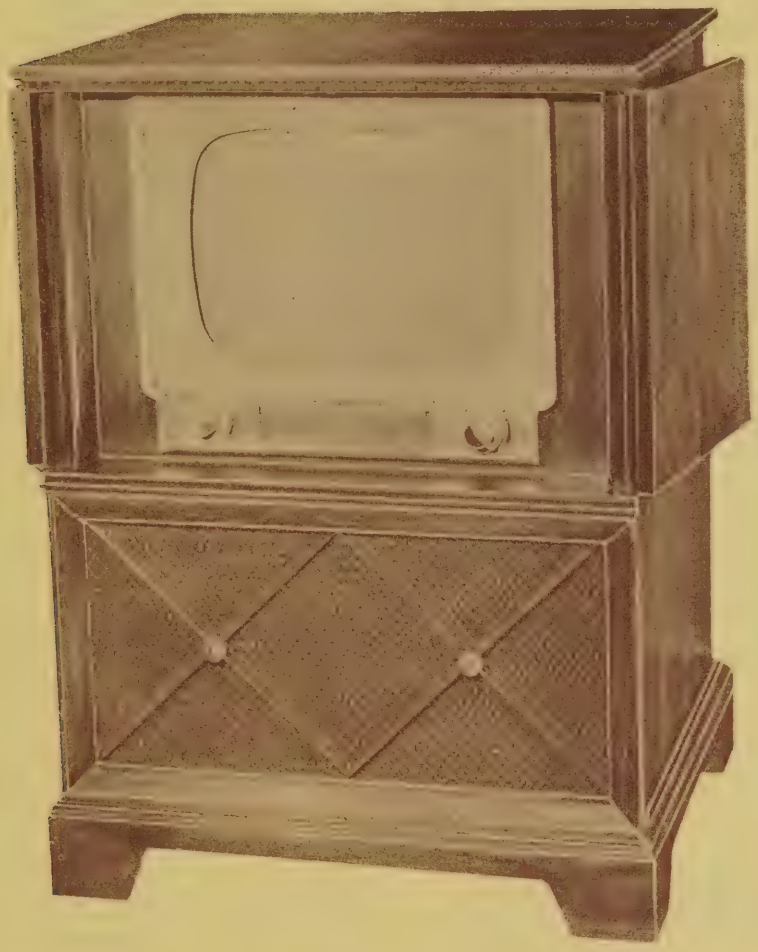

MODEL 17C110

GENERAL ELECTRIC MODELS 17C110, 17C111 (Early & "W" Versions)

HOWARD W. SAMS & CO., INC. • Indianapolis, Indiana

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PHOTOFACT* Folder
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GENERAL ELECTRIC MODELS 17C110, 17C111 (Early & "W" Versions)

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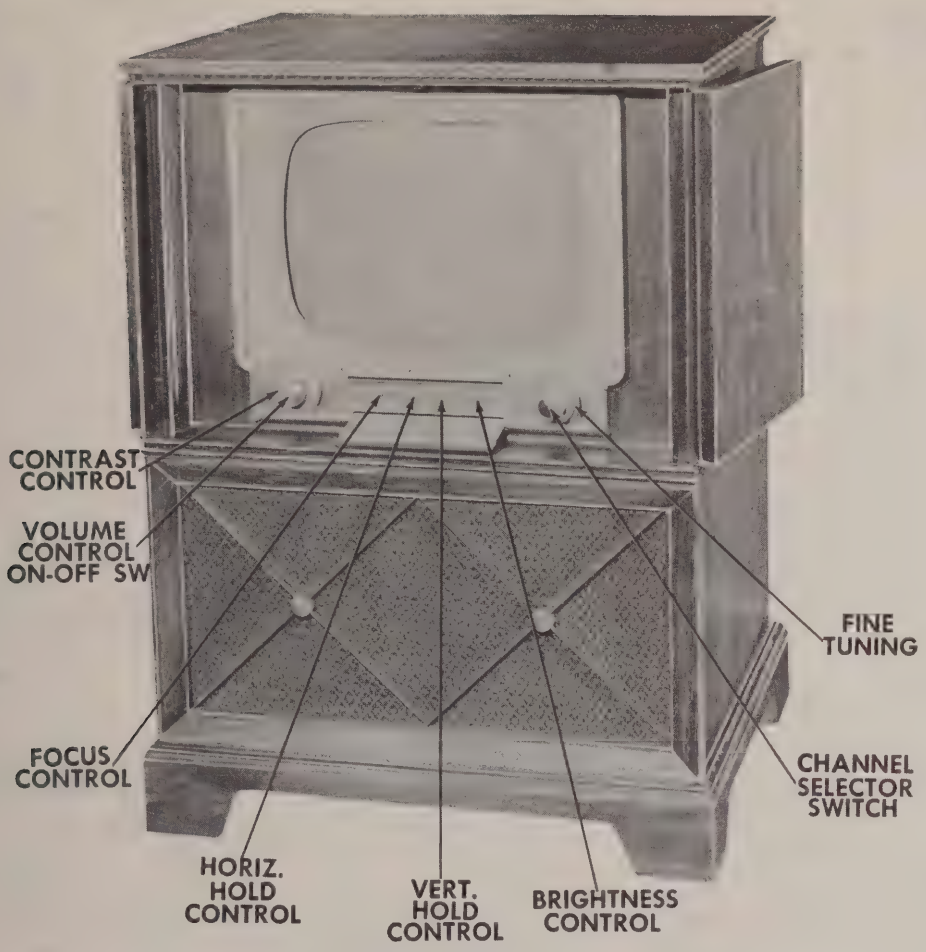

GENERAL ELECTRIC 17C110

TRADE NAME	General Electric Models 17C110, 17C111 (Early, "D", & "W" Versions)
MANUFACTURER	General Electric Co., Electronics Dept., Electronics Park, Syracuse, N. Y.
TYPE SET	Television Receiver
TUBES	Twenty-Four

POWER SUPPLY 110-120 Volts AC-60 Cycle RATING 2.1 Amp. @ 117 Volts AC
TUNING RANGE—Channels 2 thru 13

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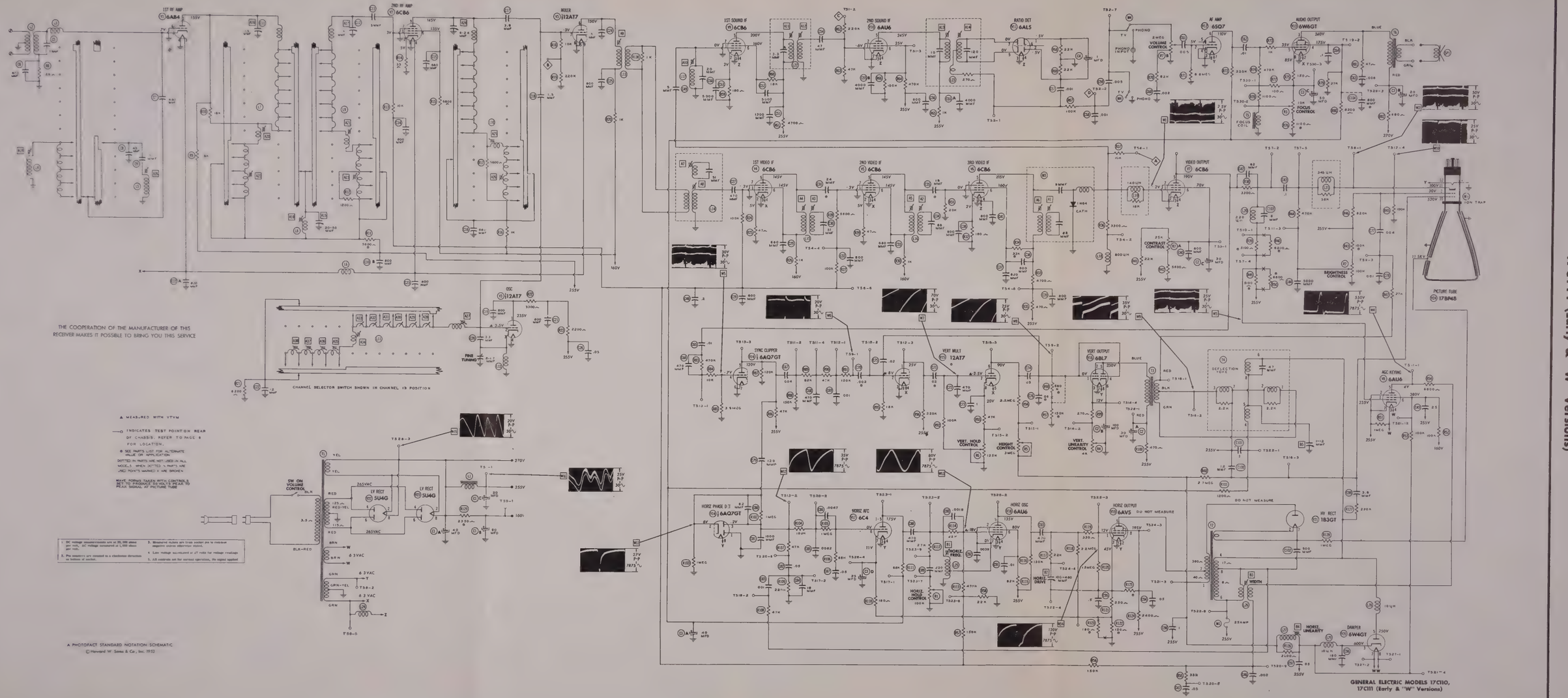
1ST RF AMP V1 6AB4
2ND RF AMP V2 6CB6
MIXER V3 12AT7
OSC V4 12AT7
1ST SOUND IF V9 6CB6
2ND SOUND IF V10 6AU6
RATIO DET V11 6AL5
AF AMP V12 6SQ7
AUDIO OUTPUT V13 6W6GT
1ST VIDEO IF V14 6CB6
2ND VIDEO IF V15 6CB6
3RD VIDEO IF V16 6CB6
VIDEO OUTPUT V17 6CB6
SYNC CLIPPER V18 6AQ7GT
VERT MULT V19 12AT7
VERT OUTPUT V20 6BL7
HORIZ PHASE D-T V21 6AQ7GT
90 HORIZ AFC V22 6C4
HORIZ OSC V23 6AU6
HORIZ OUTPUT V24 6AV5
HV RECT V25 1B3GT
AGC RCTFR V26 6AU6
DAMPER V27 6W4GT
LV RECT V28 5U4G
LV RECT V29 5U4G
PICTURE TUBE V30 17BP4B
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 13 POSITION
A MEAS-RED WITH VTVM
INDICATES TEST POINT ON REAR OF CHASSIS. REFER TO PAGE 8 FOR LOCATION.
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION.
DOTTED IN PARTS ARE NOT USED IN ALL MODELS. WHEN DOTTED 'L' PARTS ARE USED DON'T'S MARKED X ARE BROKEN.
WAVE FORMS TAKEN WITH CONTROLS SET TO FREQUENCY 3.5 VOLTS PEAK TO PEAK SIGNAL AT PICTURE TUBE
1. DC voltage measurements are at 20,000 ohms per volt. AC voltage measured at 1,000 ohms per volt.
2. Resistors are rounded to a clockwise direction on bottom of socket.
3. Measured values are to be socket pin to chassis negative except otherwise noted.
4. Line voltage as required or 'T' valve for voltage readings
5. All controls set for normal operation, no signal applied
A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1952
DO NOT MEASURE
GENERAL ELECTRIC MODELS 17C110, 17C111 (Early & "W" Versions)

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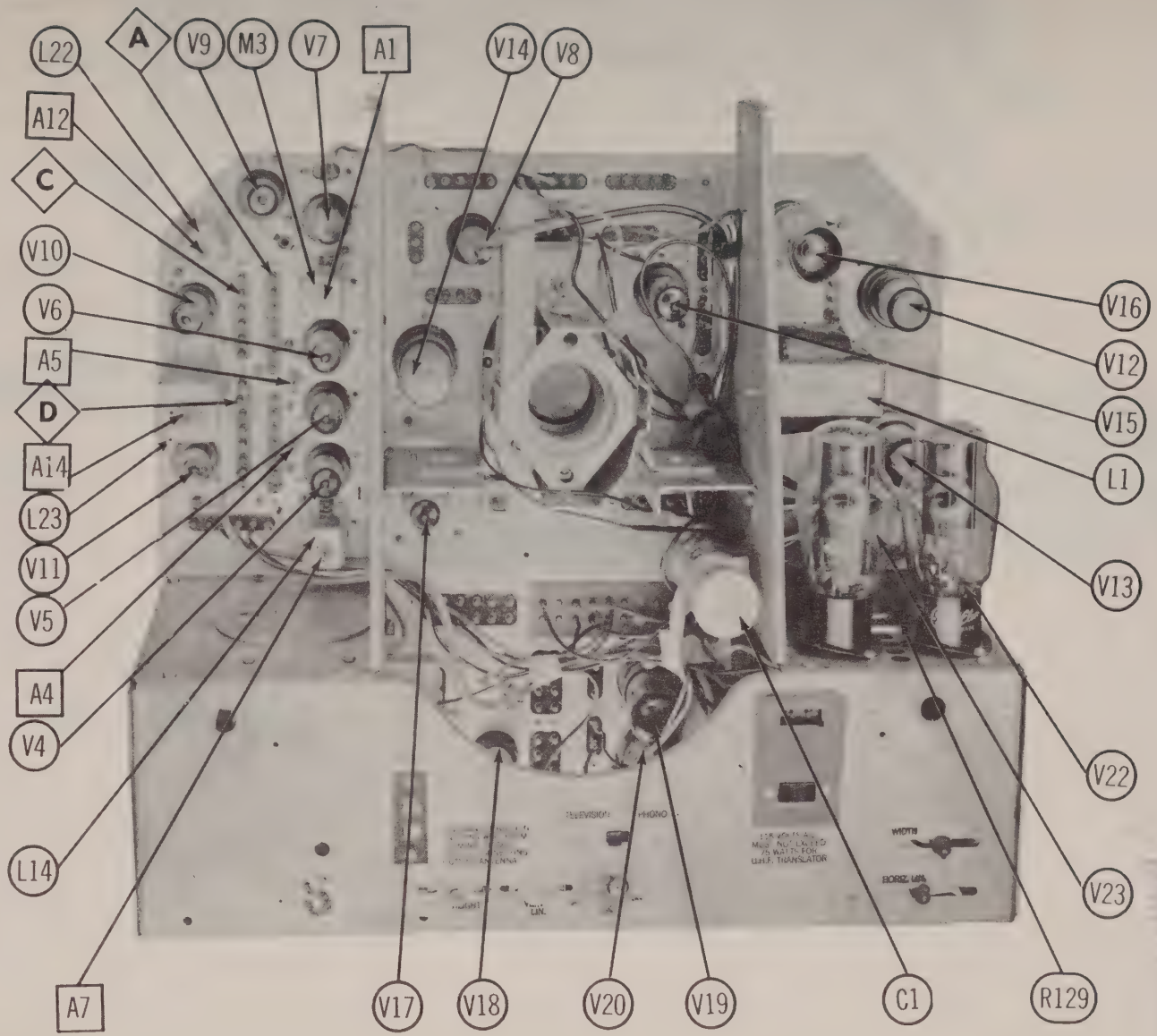

CHASSIS -REAR VIEW

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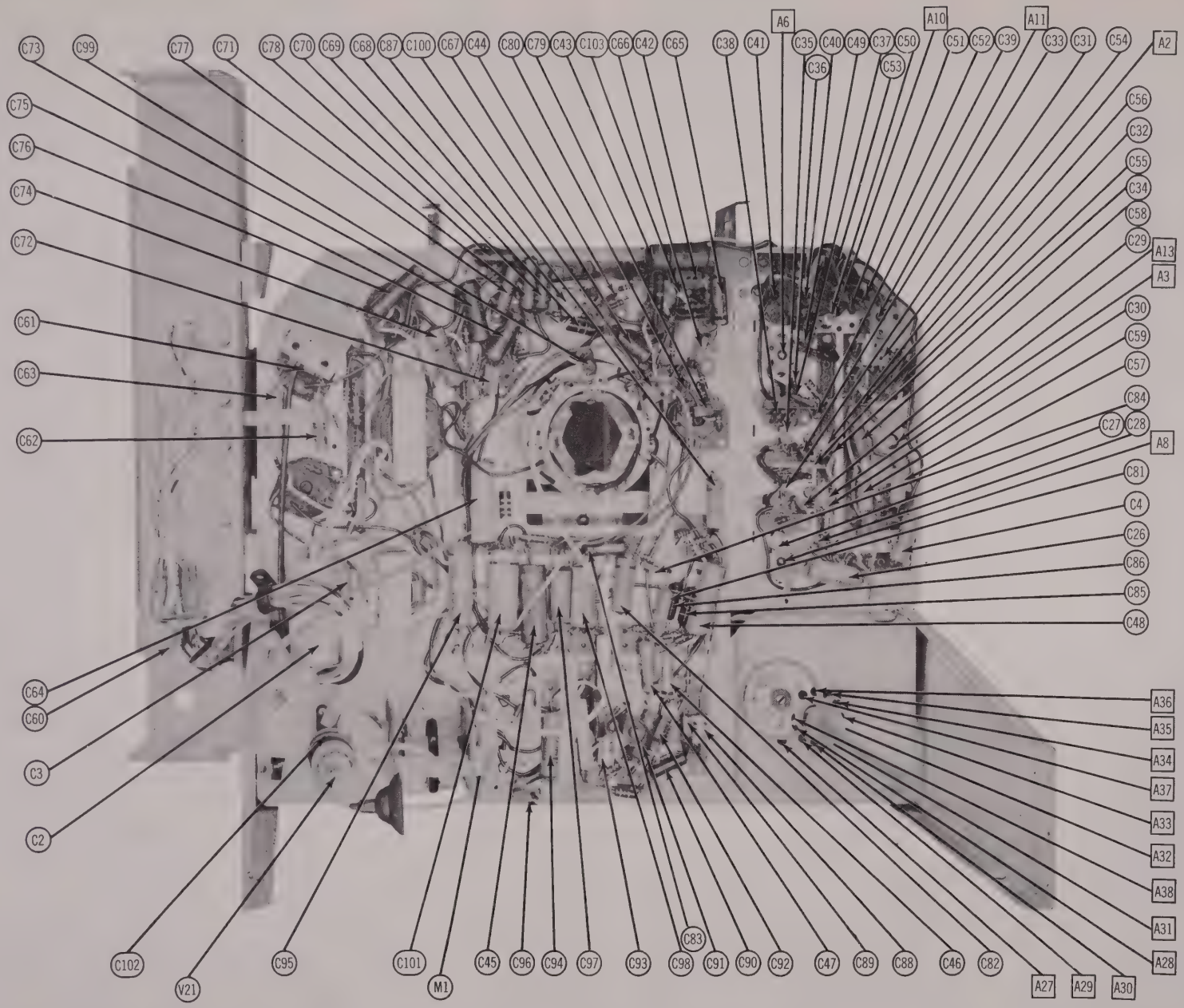
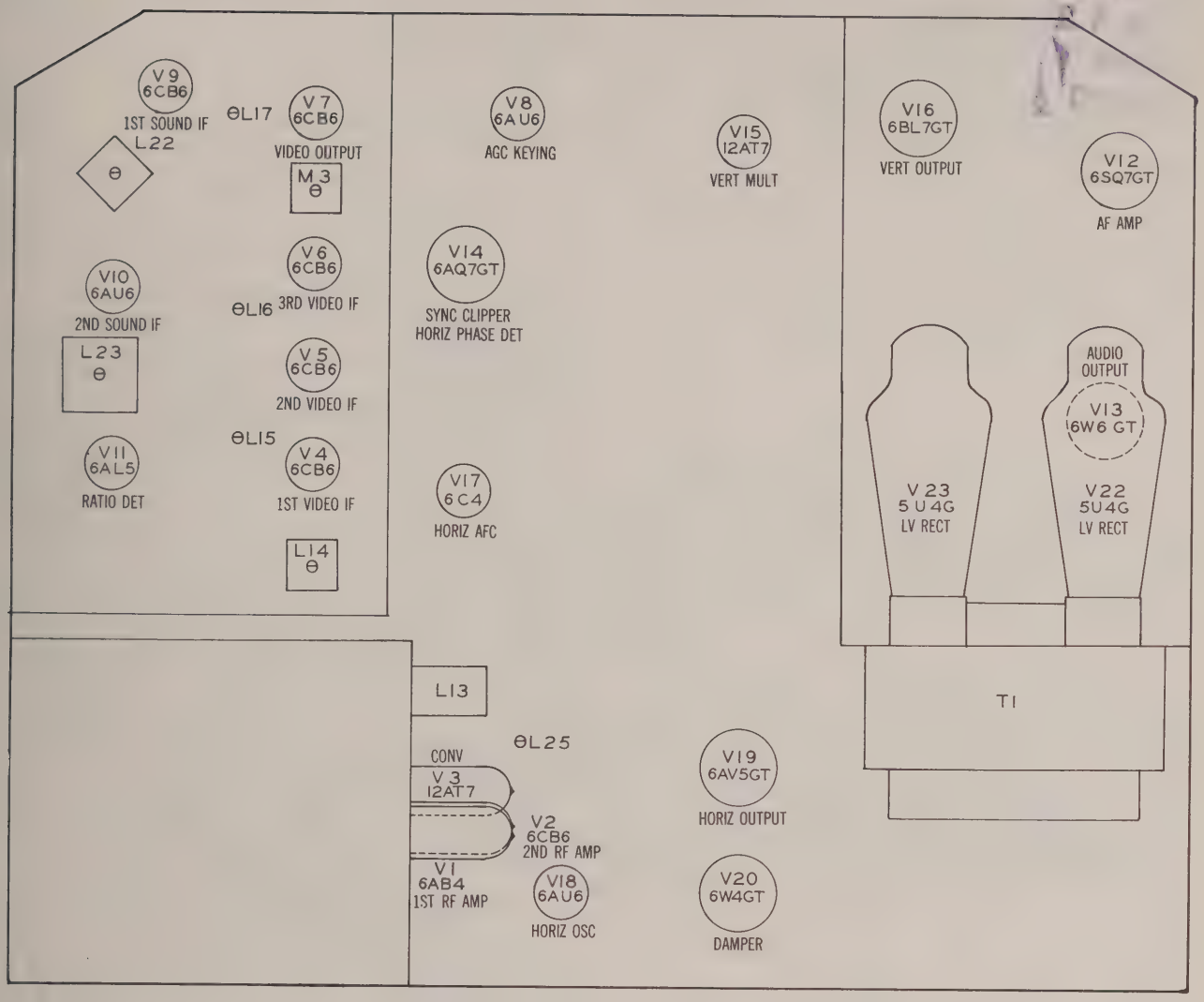


CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

TUBE PLACEMENT CHART



REAR VIEW

TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY
No raster, no sound-V22, V23

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster-V2, V3, V4, V5, V6
No pic, no sound, has snow-V1, V2, V3, V4
No pic, has sound, has raster-V7, V24
Has pic, no sound- V9, V10, V11, V12, V13
Overloaded picture-V8

SYNC FAILURE
No vert. sync-V14, V15
No horiz. sync. -V14, V17, V18
No vert. or horiz. sync.-V14

SWEEP FAILURE
No raster, has sound-V18, V19, V20, V21, V24, Fuse (M1)
No vertical deflection-V16
Poor vert linearity or foldover-V15, V16
Poor horiz. linearity or foldover-V18, V19, V20
Narrow picture-V18, V19, V20, V21, V22, V23
Vert. off freq. -V14, V15
Horiz. foff freq.-V14, V17, V18

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard can be eliminated by removing the horizontal output tube, V19.

VIDEO IF ALIGNMENT

Connect the negative lead of a 3 V. battery to the ungrounded side of C28. Connect the positive lead to chassis.
Set the channel selector switch to Channel 11 or any other channel where no oscillator interference is noted.
Check for interference by rotating the fine tuning control and observing the response curve for any change in shape.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.001MFD	High side to pin 1 (grid) of 6CB6 (V4) Low side to chassis.	43MC (10MC Swp)	39.75MC 41.25MC 47.25MC	11 or any non-interfering channel	Vert. amp. to point (A). Low side to chassis.	A1, A2, A3	Adjust A1 for MINIMUM response at 39.75MC Adjust A2 for MINIMUM response at 41.25MC Adjust A3 for MINIMUM response at 47.25MC
2.	"	"	"	45.75MC	"	"	A4	Adjust place 45.75MC marker at 50% of response as per fig 1.
3.	"	"	"	42.50MC	"	"	A5, A6	Adjust A5 to place 52.50MC marker at 50% of response as per fig 1. Adjust A6 for flat top response as per fig. 1.
4.	"	High side to point B. Low side to chassis.	"	39.75MC 41.25MC 47.25MC	"	"	A1, A2 A3, A7	Readjust A1, A2 and A3 for MINIMUM as in step 1. Adjust A7 for MINIMUM response at 47.25MC.
5.	"	"	"		"	"	A8, A9	Adjust for maximum amplitude and for flat top response.
6.	"	"	"	42.5MC 45.75MC	"	"	A4, A5	Adjust A4 to place 45.75MC marker at 50% on response curve. Adjust A5 to place 42.5MC marker at 50% on response curve as in fig 1.

SOUND IF ALIGNMENT

Detune the primary of the ratio detector transformer by turning A13 a few turns.
Connect bias battery as under Video IF Alignment except use 7.5 volts instead of 3V.
Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	.001MFD	High side to pin 1 (grid) of 6CB6 (V6). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any non-interfering channel	Vert. amp. to point (C). Low side to chassis.	A10, A11 A12	Adjust for curve of maximum amplitude and symmetry as per fig. 2.
8.	"	"	"	"	"	Vert. amp. to point (D). Low side to chassis.	A14, A13 A14	Adjust A14 so that 4.5MC occurs at center of crossover lines. Adjust A13 for maximum amplitude and straightness of crossover lines as per fig.3.

RF ALIGNMENT

RF Alignment is performed in two operations.
In the first operation the cathode and plate circuits of the first RF amp, and the grid circuit of the second RF amp. are aligned.
During this operation B+ voltages are removed from V2 and both sections of V3. The grid circuit of V2 is used as a detector to rectify the signal. See figure 5 for B+ connection terminal strip. In the second operation the plate circuit of the second RF amplifier is aligned.
During this operation the B+ voltage is reconnected to V2 and to the converter section of V3. The oscillator section of V3 is left disabled.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	See fig. 4	Thru dummy antenna to tuner input terminals	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. amp. to AGC terminal on tuner terminal strip (fig. 5) Low side to chassis.	A15, A16 A17	Disconnect B+ from second RF amp. (V2) and converter section of V3. Disconnect B+ from oscillator section of V3. Disconnect white AGC wire from terminal strip on tuner (fig. 5) and connect a 470K Ω resistor from same terminal to chassis. Adjust A15 for proper band width on Channel 13 as per fig. 6. Adjustment of A15 gives two peaks of bandwidth. Use the one which gives slightly wider bandwidth on Channel 12. Adjust A16 and A17 to place markers as shown in fig. 6.
10.	"	"	207MC (10MC Swp)	205.25MC 209.75MC	12	"		Check for response curve within the limits of figures 7A and 7B. If necessary make compromise adjustments of A16 and A17 to bring Channels 13 thru 7 within these limits.
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
11.	"	"	85MC (10MC Swp)	83.25MC 87.75MC	6	"	A18, A19 A20, A21	Adjust A18 for proper bandwidth as per fig. 6. Adjust A19, A20 and A21 for proper marker placement as per fig. 6. A19 is not found on late production tuners which are rubber stamped "D".

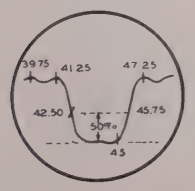


FIG.1

FIG.2

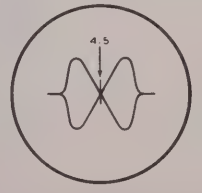
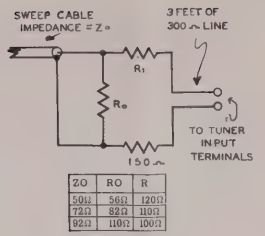


FIG.3



ZO	RO	R
50Ω	56Ω	120Ω
72Ω	82Ω	110Ω
92Ω	110Ω	100Ω

FIG.4

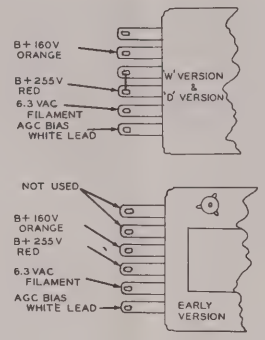


FIG. 5

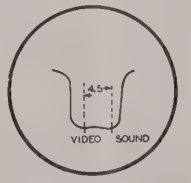


FIG.6

ALIGNMENT INSTRUCTIONS (CONT.)

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
12.	"	"	79MC (10MC Swp) 69MC (10MC Swp)	77.25MC 81.75MC 67.25MC 71.75MC	5 4	"		Check for response curve with in the limits of figs. 7A and 7B. If necessary make compromise adjustments of A20 and A21 to bring channels 6, 5 and 4 within these limits.
13.	"	"	63MC (10MC Swp)	61.25MC 65.75MC	3	"	A22, A23	Adjust for maximum amplitude and proper marker placement as per fig. 6.
14.	"	"	57MC (10MC Swp)	55.25MC 59.75MC	2	"		Check for response curve within the limits of figs 7A and 7B. If necessary make compromise adjustments of A22 and A23. to bring channels 3 and 2 within these limits
15.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. amp. to point (B). Common to chassis.	A24	Reconnect B+ to V2 and converter section of V3. Do not connect B+ to oscillator section of V3. Remove the 470Ω resistor and reconnect the AGC bias. Connect a 3 volt bias battery as under Video IF alignment. Adjust A24 for flat topped response as per fig 6.
16.	"	"	207MC (10MC Swp) 201MC (10MC Swp) 195MC (10MC Swp) 189MC (10MC Swp) 183MC (10MC Swp) 177MC (10MC Swp)	205.25MC 209.75MC 199.25MC 203.75MC 193.25MC 197.75MC 187.25MC 191.75 MC 181.25MC 185.75MC 175.25MC 179.75MC	12 11 10 9 8 7	"		Check for response curve within the limits of figs 7A and 7B. If necessary make compromise adjustments of A24 to bring channel 13 thru 7 within limits.
17.	"	"	85MC (10MC Swp)	83.25MC 87.75MC	6	"	A25	Adjust for flat-topped response as per fig. 6.
18.	"	"	79MC (10MC Swp) 69MC (10MC Swp)	77.25MC 81.75MC 67.25MC 71.75MC	5 4	"		Check for response curve within the limits of figs. 7A and 7B. If necessary make compromise adjustment of A25 to bring channels 6, 5 and 4 within these limits.
19.	"	"	63MC (10MC Swp)	61.25MC 65.75MC	3	"	A26	Adjust for flat topped response as per fig.6.
20.	"	"	57MC (10MC Swp)	55.25MC 59.75MC	2	"		Check for response curve within the limits of figs. 7A and 7B. If necessary make compromise adjustment of A26 to bring Channel 3 and 2 within these limits.

OSCILLATOR ALIGNMENT

Reconnect the B+ to the oscillator section of V3.
Connect the 3 V. bias battery as under Video IF Alignment.
Turn the fine tuning control fully counter clockwise, then clockwise one half turn.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
21	Fig. 4	Thru dummy antenna to tuner input terminals (remove 300Ω lead from tuner to antenna terminals)	213MC (10MC Swp)	211.25MC	13	Vert. amp. to point (A). Low side to chassis.	A27	Adjust to place video marker at 50% on the high frequency side of response curve as per fig 8.
			207MC (10MC Swp)	205.25MC	12		A28	
			201MC (10MC Swp)	199.25MC	11		A29	
			195MC (10MC Swp)	193.25MC	10		A30	
			189MC (10MC Swp)	187.25MC	9		A31	
			183MC (10MC Swp)	181.25MC	8		A32	
			177MC (10MC Swp)	175.25MC	7		A33	
			85MC (10MC Swp)	83.25MC	6		A34	
			79MC (10MC Swp)	77.25MC	5		A35	
			69MC (10MC Swp)	67.25MC	4		A36	
			63MC (10MC Swp)	61.25MC	3		A37	
			57MC (10MC Swp)	55.25MC	2		A38	

IF INTERFERENCE TRAP ADJUSTMENT

Turn the set on and tune to TV station on which the IF interference is noted.
Adjust A39 for minimum interference pattern on the screen. Do not adjust A39 to the point where Channel 2 is attenuated.

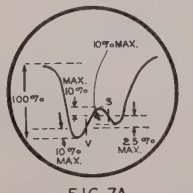


FIG.7A

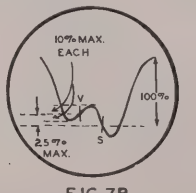


FIG.7B

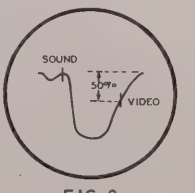
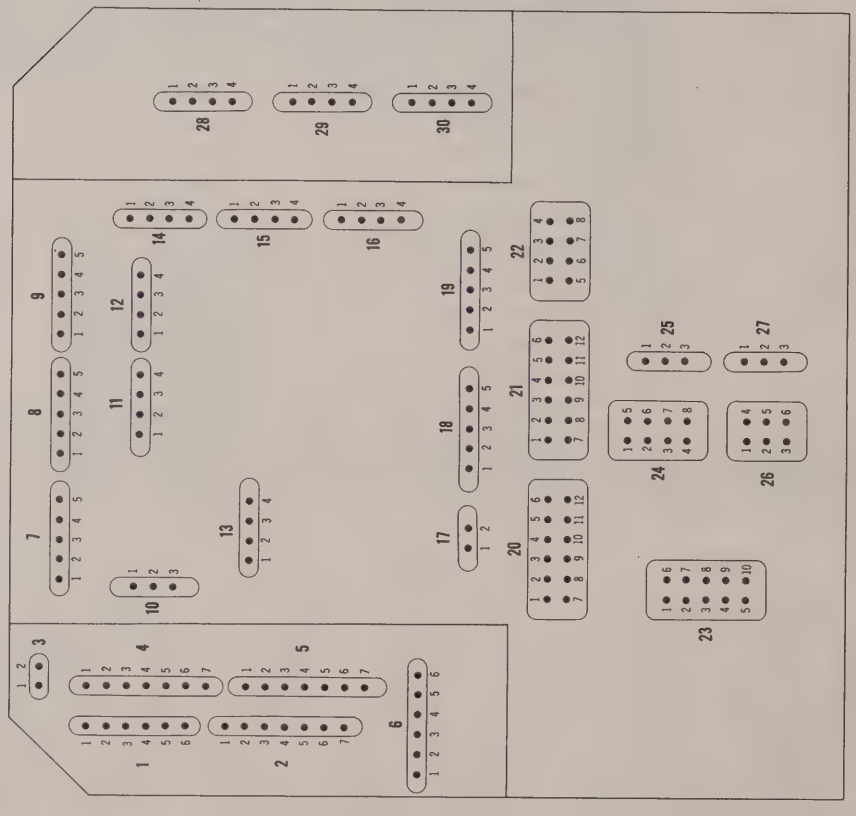


FIG.8

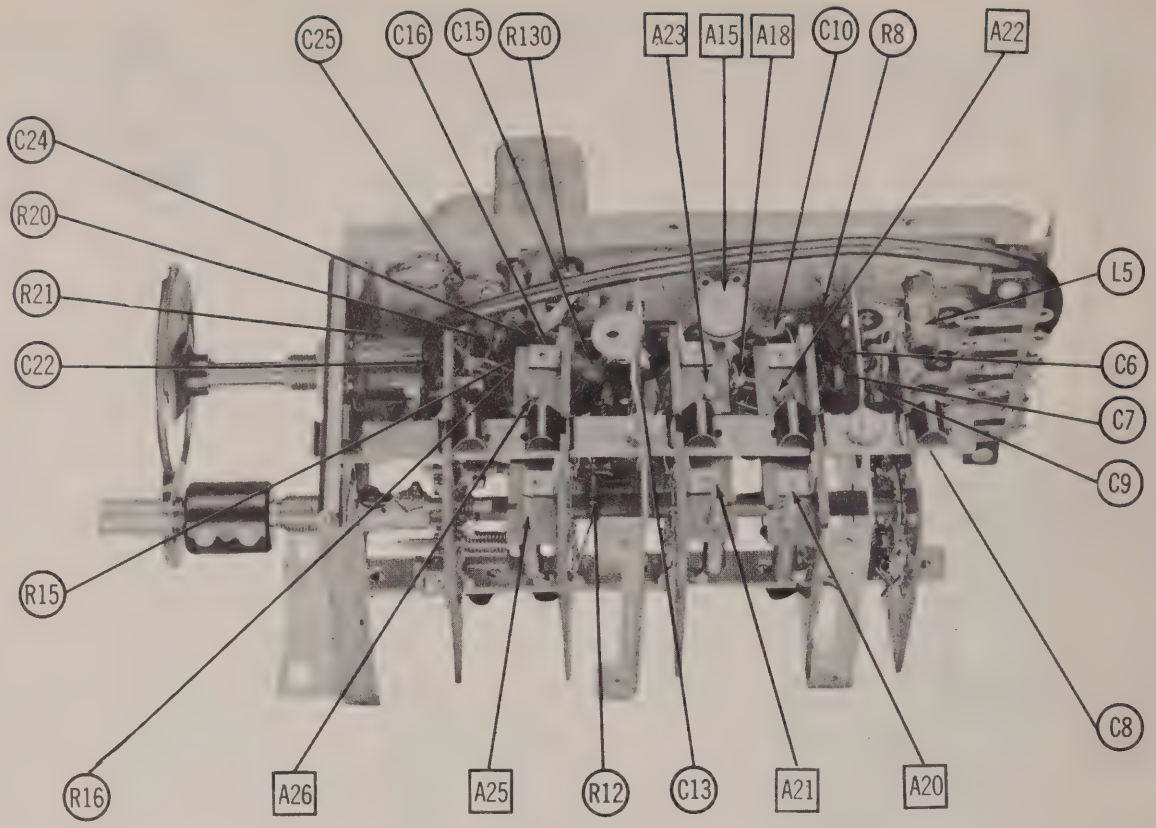
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AB4	†5.6KΩ	0Ω	.1Ω	0Ω	†2KΩ	0Ω	120Ω		
V 2	6CB6	182KΩ	33Ω	0Ω	.3Ω	†3KΩ	†8.8KΩ	0Ω		
V 3	12AT7	†5.6KΩ	8.2KΩ	.2Ω	0Ω	0Ω	†3KΩ	230KΩ	0Ω	.3Ω
V 4	6CB6	270KΩ	47Ω	0Ω	.1Ω	†3KΩ	†3KΩ	0Ω		
V 5	6CB6	275KΩ	47Ω	0Ω	.1Ω	†3KΩ	†3KΩ	0Ω		
V 6	6CB6	20KΩ	180Ω	0Ω	.1Ω	†5.2KΩ	†38KΩ	0Ω		
V 7	6CB6	3.3KΩ	0Ω	0Ω	.1Ω	†9.2KΩ	11KΩ	0Ω		
V 8	6AU6	†3KΩ	†70Ω	¶0Ω	¶.1Ω	330KΩ	†100KΩ	†70Ω		
V 9	6CB6	2.3Ω	180Ω	0Ω	.1Ω	†4.8KΩ	†23KΩ	0Ω		
V 10	6AU6	47KΩ	0Ω	0Ω	.1Ω	†1.1KΩ	80KΩ	0Ω		
V 11	6AL5	22KΩ	22KΩ	0Ω	.1Ω	INF	INF	INF		
V 12	6SQ7	0Ω	6.8Meg	0Ω	0Ω	INF	†220KΩ	.1Ω	0Ω	
V 13	6W6GT	INF	.1Ω	†910Ω	†7.5KΩ	470KΩ	470KΩ	0Ω	2.4KΩ	
V 14	6AQ7GT	0Ω	1 Meg	2 Meg.	3.9 Meg	†35KΩ	0Ω	0Ω	.1Ω	
V 15	12AT7	†220KΩ	18KΩ	0Ω	.1Ω	.1Ω	#3 Meg	100KΩ	100KΩ	0Ω
V 16	6BL7GT	830KΩ	†1.2KΩ	800Ω	830KΩ	†1.2KΩ	800Ω	0Ω	.1Ω	
V 17	6C4	†69KΩ	3.2Meg	0Ω	.1Ω	†69KΩ	3.1Meg	262Ω		
V 18	6AU6	22KΩ	55Ω	0Ω	.1Ω	†150KΩ	†82KΩ	55Ω		
V 19	6AV5GT	900KΩ	.1Ω	330Ω	INF	#70Ω	INF	0Ω	†2.5KΩ	
V 20	6W4GT	INF	INF	220KΩ	INF	†95Ω	INF	¶0Ω	¶.1Ω	
V 21	1B3GT	PINS 1-8 HAVE INF RESISTANCE								Top Cap #430Ω
V 22	5U4G	INf	16KΩ	INF	125Ω	INF	115Ω	INF	16KΩ	
V 23	5U4G	INF	16KΩ	INf	125Ω	INF	115Ω	INF	16KΩ	
V 24	17BP4B	0Ω	100KΩ	Pin 10 #2.7Meg	Pin 11 480KΩ	Pin 12 .1Ω				

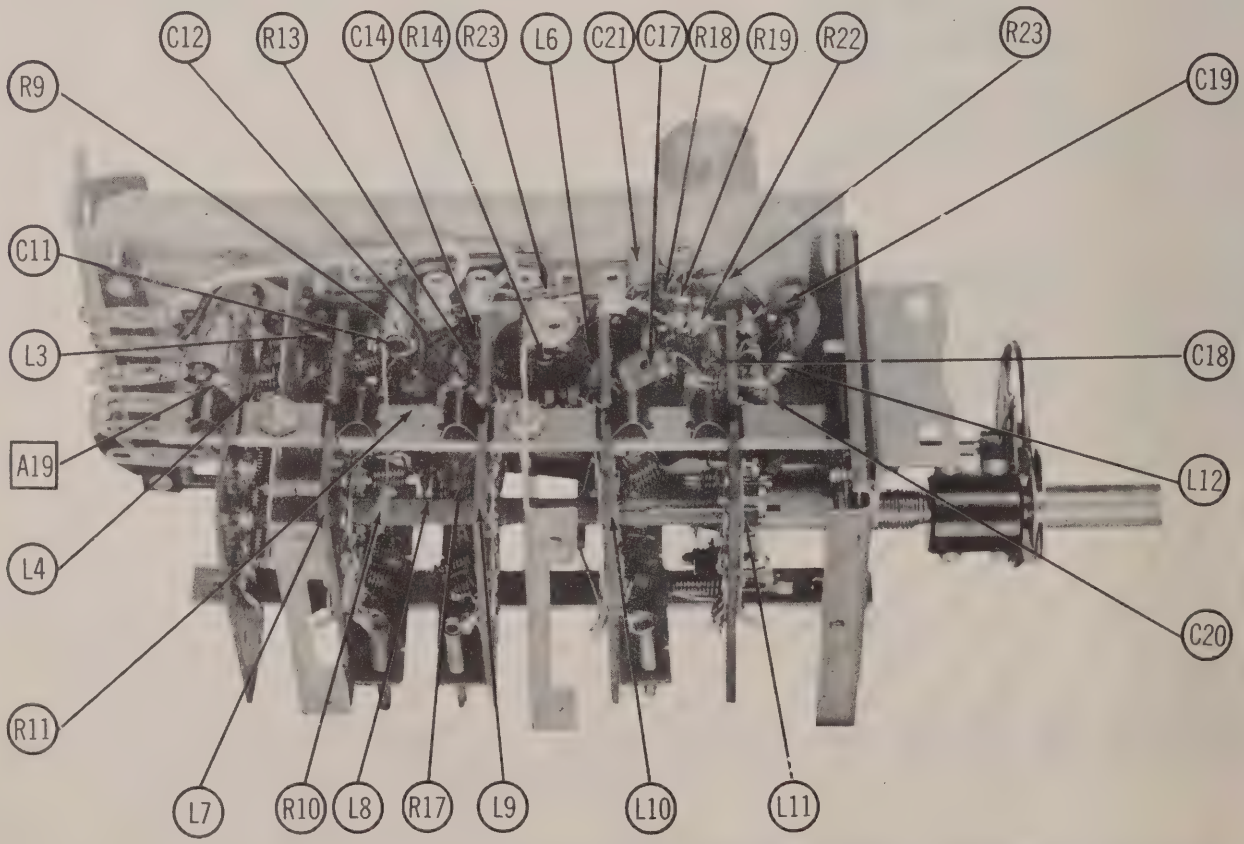
ALL CONTROLS SET FOR NORMAL OPERATION, NO SIGNAL APPLIED.
† MEASURED FROM PIN 8 OF V22 & V23.
# MEASURED FROM PIN 3 OF V20.
¶ MEASURED FROM PIN 3 OF V8.



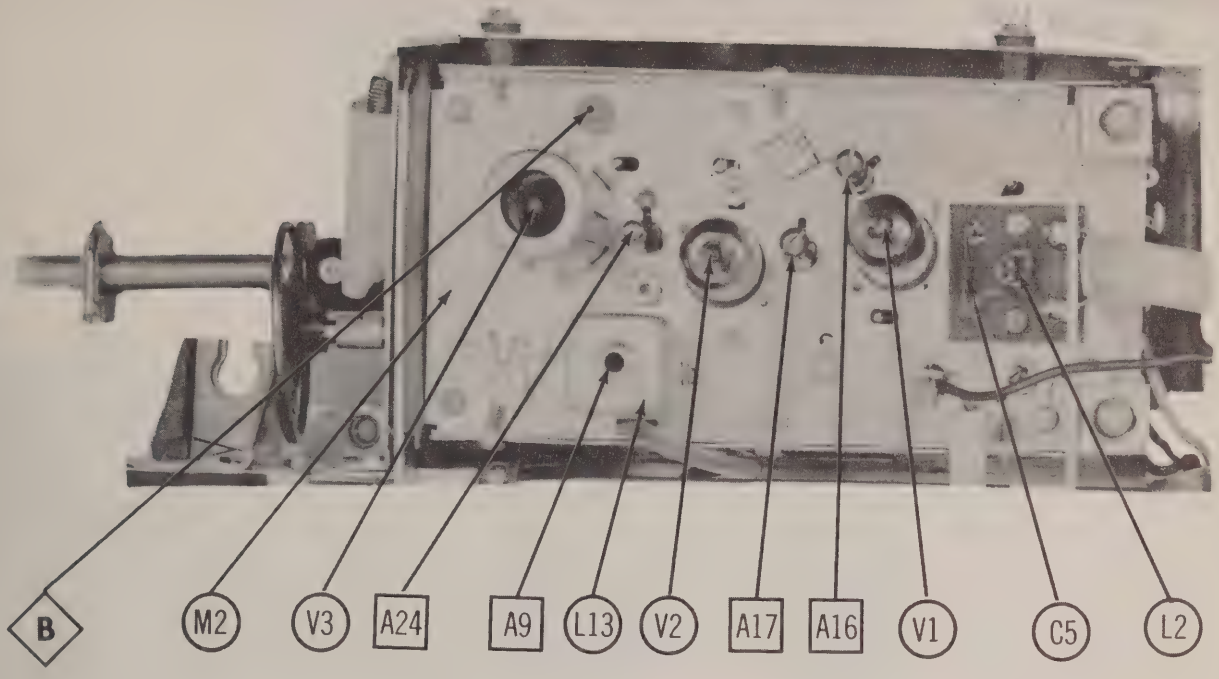
TEST POINT LAYOUT



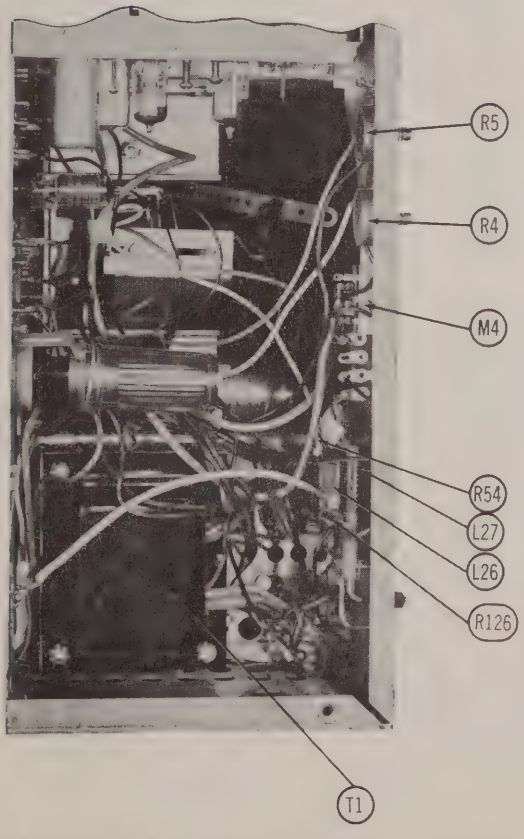
RF TUNER-RIGHT SIDE



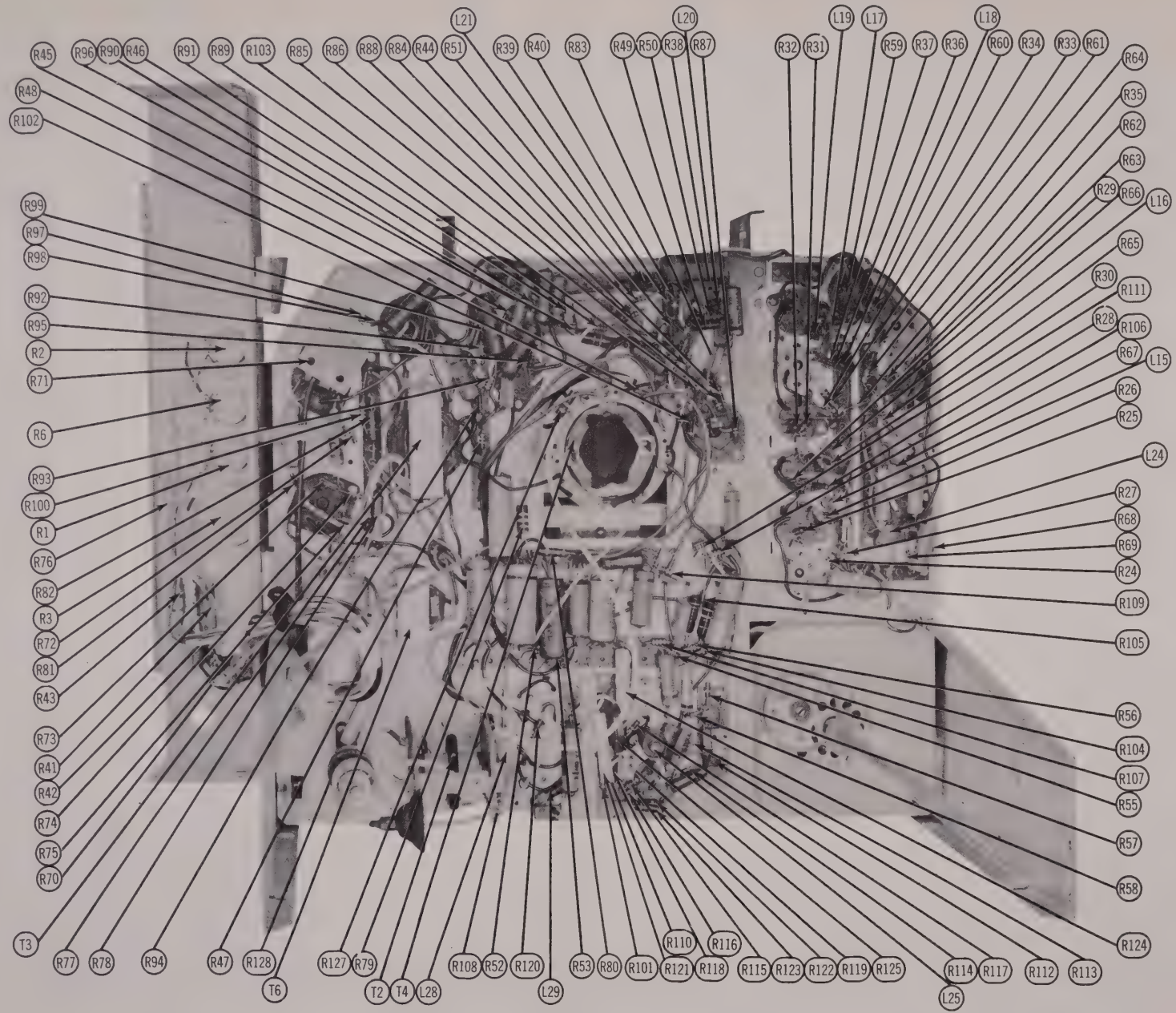
RF TUNER-LEFT SIDE



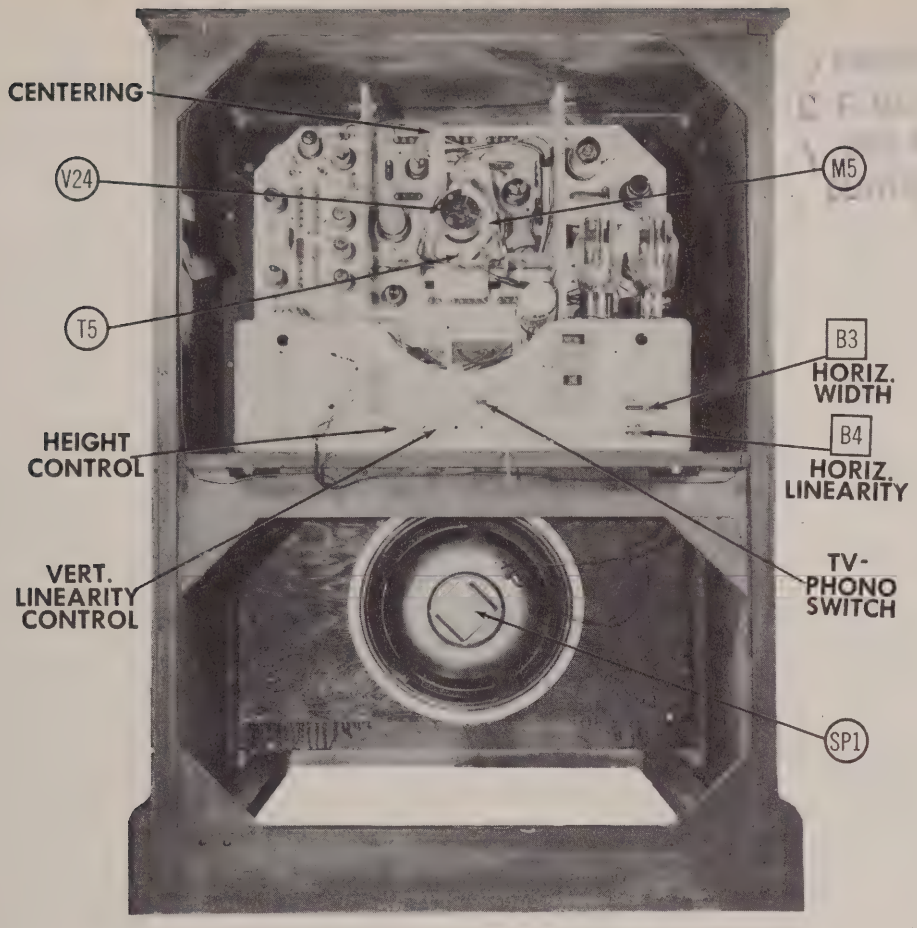
RF TUNER – TOP VIEW



PARTIAL CHASSIS - BOTTOM VIEW



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION



CABINET-REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Set the horizontal hold control to the mid-position of its range. Adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally.

Adjust the horizontal drive trimmer (B2) for maximum picture width without vertical white lines or compression of the center of picture.

Adjust the width control slug (B3) for a picture slightly wider than enough to fill the picture mask.

Adjust the horizontal linearity slug (B4) for a picture that is symmetrical from left to right.

The width and horizontal linearity controls are interactive and adjustment of one may necessitate slight readjustment of the other.

DEFLECTION YOKE TRIMMER ADJUSTMENT

The deflection yoke trimmer (B5) is to be adjusted to eliminate any wiggles in the horizontal sweep lines which may appear at the left side of the picture in some receivers.

DISASSEMBLY INSTRUCTIONS

1. Remove 8 push on type control knobs from front panel.
2. Remove 11 wood screws. Remove rear cover.
3. Remove speaker plugs from speaker.
4. Remove 6 chassis bolts. Remove chassis.
5. Remove 4 speaker nuts. Remove speaker.

NOTE: FOR PICTURE TUBE REMOVAL IT IS NECESSARY TO REMOVE CHASSIS AS OUTLINED ABOVE.

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: General Electric PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V1	1st. RF Amplifier	6AB4	6AB4	5CE	
V2	2nd. RF Amplifier	6CB6	6CB6	7CM	
V3	Converter	12AT7	12AT7	9A	
V4	1st. Video IF Amp.	6CB6	6CB6	7CM	
V5	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V6	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V7	Video Amp.	6CB6	6CB6	7CM	
V8	AGC Keying	6AU6	6AU6	7BK	
V9	1st. Sound IF Amp.	6CB6	6CB6	7CM	
V10	2nd. Sound IF Amp.	6AU6	6AU6	7BK	
V11	Ratio Detector	6AL5	6AL5	6BT	
V12	AF Amplifier	6SQ7	6SQ7	8Q	
V13	Audio Output	6W6GT	6W6GT	7AC	
V14	Sync Clipper - Horiz. Phase Det.	6AQ7GT	6AQ7GT	8CK	
V15A	Vert. Mult.	12AT7	12AT7	9A	
B	Vert. Mult.	12AU7	12AU7	9A	
V16	Vert. Output	6BL7GT	6BL7GT	8BD	
V17	Horiz. AFC	6C4	6C4	6BG	
V18	Horiz. Oscillator	6AU6	6AU6	7BK	
V19	Horiz. Output	6AV5GT	6AV5GT	6CK	
V20	Damper	6W4GT	6W4GT	4CG	
V21	HV Rectifier	1B3GT	1B3GT	3C	
V22	LV Rectifier	5U4G	5U4G	5T	
V23	LV Rectifier	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: General Electric PART No.	REPLACEMENT DATA: SYLVANIA PART No.		RTMA BASE TYPE	NOTES
V24	17BP4B	17BP4A		12D	
		17BP4 ①		12D	① Add high voltage capacitor
		17HP4 ②		12C	② Circuit changes necessary. Tape focus coil to chassis.
		17RP4 ②		12C	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: General Electric PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	■40	350	RCE-130	AFH3-46		UPT84245		FP378	TVL-3645	
B	▲90	350								
C	▲20	350								
C2A	▲30	350	RCE-128	AFH4-87		UP3345		FP237	TVL-3764	
B	▲100	75				BR10015		TC496		
C	■30	350								
C3A	▲40	350	RCE-129	AFH4-52		UPT42235C			TVL-3640	
B	■20	350							TVA-1205	
C	▲50	150								
D	25	25								
C4	1	50	RCE-090	PRS150/4		BBR-1-50T		TC31	TVA-1300	
C5	1		RCY-001		TCZ-1		NP0K-010			
C6	800		RCW-3037	BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C7	680		RCW-3045	SI680	D6-681		GP2K-681	UC-5368	5GA-T68	
C8	43		UCG-2019							
C9	5	500	UCG-1005	1469-000005	TCZ-5	5R5V5	NP0K-050	MCB205	MS-55	
C10A	800		RCN-027	BPD-2X001	DD-2-102	TM5DD1	812-001	DCD-521	5HK-2D1	
B	800									
C11	1-5		RCY-065		829-6					
C12	1-5		RCY-065		829-6					
C13	5		RCW-3057	SI5			GP1K-050	ZT-555		
C14	800		RCW-3037	BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C15	680		RCW-3047	SI680	D6-681		GP2K-681	UC-5368	5GA-T68	
C16	680		RCW-3027	SI680	D6-681		GP2K-681	UC-5368	5GA-T68	
C17	3.9						NP0K-3R9			
C18	1.5		RCW-3046				N750K-1R5			
C19	800		RCW-3037	BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C20	3.3		RCW-3037	SI3.3NP0	TCZ-3.3		NP0K-3R3	ZT-5533		
C21	800		RCW-3037	BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C22	12	500	UCG-1006		TCZ-12		NP0K-120			
C23	800		RCW-3037	BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C24	5	500	UCG-1005	1469-00005	TCZ-5	5R5V5	NP0K-050	MCB205	MS-55	
C25	800		RCW-3037	BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C26	.05	600	UCC-045	P688-05	DF-503	PTE8S5		PT815	6TM-S5	
C27	470	500	UCG-1047	1469-0005	D6-470	5R5T5	GP2K-471	MCB245	MS-35	
C28	800		RCW-3037	BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C29	680		RCW-3051	SI680	D6-681	2R5T7	GP2K-681	UC-5368	5GA-T68	
C30	51	500	UCG-2021	1469-00005		5R5Q5		MCB225	MS-45	
C31	24		RCW-3050		TCZ-24		NP0K-240			Note 1
C32	800		RCW-3037	BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C33	680		RCW-3051	SI 680	D6-681	2R5T7	GP2K-681	UC-5368	5GA-T68	
C34	68	500	RCW-3064	1469-00007		5R5Q7			MS-47	
C35	18	500	UCG-2010			5R5Q2			MS-42	Note 2
C36	800		RCW-3037	BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C37	820		RCW-3052							
C38	800		RCW-3037	BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C39	800		RCW-3037	BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C40	800		RCW-3037	BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C41	800		RCW-3037	BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C42	82	500	UCU-1526							
C43	.1	600	UCC-048	P688-1	DF-104	PTE6P1		PT801	6TM-P1	
C44	5000		RCW-3014	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C45	.25	400	UCC-050	P488-25		PTE4P25		PT4025	4TM-P25	
C46	.002	200	UCC-035	P688-002	D6-202	PTE6D2	GP2-333-202	PT622	6TM-D2	
C47	.05	400	UCC-045	P488-05	DF-503	PTE4S5		PT415	4TM-S5	
C48	.2	200	UCC-050	P488-22		PTE4P22		PT429	2TM-P22	
C49	5	500	UCG-1005	1469-000005		5R5V5		MCB205	MS-55	
C50	20	500	UCG-2011			5R5Q2			MS-42	
C51	1300		RCW-3053							

CAPACITORS (CONT.)

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: General Electric PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C52	5000		RCW-3014	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C53	5000		RCW-3014	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C54	47	500	UCU-520	1469-00005	D6-470	5R5Q5	GP1K-470	MCB225	MS-45	
C55A	4000		RCN-047	BPD-2X004	D6-402	TM5DD4	822-004	DCD-524	5HK-2D4	
B	4000				D6-402					
C56	800		RCW-3037	BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C57	.001	600	UCC-035	P688-001	D6-102	PTE6D1	GP2L-102	PT621	6TM-D1	
C58	.001	200	UCC-035	P688-001	D6-102	PTE6D1	GP2L-102	PT621	6TM-D1	
C59	.005	200	UCC-039	P688-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5	
C60	.002	200	UCC-036	P688-002	D6-202	PTE6D2	GP2-333-202	PT622	6TM-D2	
C61	.005	200	UCC-039	P688-005	D6-502	PTE6D5	GP2-333-502	PT525	6TM-D5	
C62	.01	600	UCC-040	P688-01	D6-103	PTE8S1		PT611	6TM-S1	
C63	.008	1000	UCC-061			PTE16D8		PT628	MB-D8	
C64	.1	600	RCC-104	P688-1	DF-104	PTE6P1		PT601	6TM-P1	
C65	.01	600	UCC-040	P688-01	D6-103	PTE8S1	GP2-333-103	PT611	6TM-S1	
C66	470	500	UCU-044	1468-0005	D6-471	5W5T5	GP2K-471	MC245	1FM-35	
C67	.004	600	UCC-038	P688-004	D6-402	PTE6D4	GP2-333-402	PT624	6TM-D4	
C68	470	500		1468-0005	D6-471	5W5T5	GP2K-471	MC245	1FM-35	
C69	.001	600	UCC-035	P688-001	D6-102	PTE6D1	GP2L-102	PT621	6TM-D1	
C70	.002	600	UCC-036	P688-002	D6-202	PTE6D2	GP2-333-202	PT622	6TM-D2	Note 3
C71	.02	600	UCC-041	P688-02	DF-203	PTE6S2		PT612	6TM-S2	Note 5
C72	470	500		1469-0005		5R5T5		MCB245	MS-35	
C73	.1	200	UCC-048	P288-1	DF-104	PJ2P1		PT401	2TM-P1	
C74	.05	600	UCC-045	P688-05	DF-503	PTE8S5		PT815	6TM-S5	
C75	.02	200	UCC-041	P488-02	DF-203			PT412	2TM-S2	
C76	.06	200	RCC-109	684-06				PT616	6TM-S6	Note 6
C77	.004	600	UCC-038	P688-004	D6-402	PTE6D4	GP2-333-402	PT624	6TM-D4	
C78	.001	600	UCC-035	P688-001	D6-102	PTE6D1	GP2-102	PT621	6TM-D1	
C79	120	500	UCG-1030	1469-00015		5R5T15		MCB236		
C80	82	500	UCG-1026							
C81	1000	500	UCU-1052	1468-001	D6-102	1W5D1	GP2L-102	MC255	1FM-21	
C82	.05	600	RCC-102	P688-05	DF-503	PTE8S5		PT615	6TM-S5	
C83	.001	600	UCC-035	P688-001	D6-102	PTE6D1	GP2L-102	PT621	6TM-D1	
C84	18	500	RCN-046			5R5Q2			MS-42	
C85	.0082	400	RCN-054							
C86	.0047	600	RCN-051	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	
C87	.05	200	RCC-105	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C88	470	500		1468-0005	D6-471	5W5T5	GP2K-471	MC245	1FM-35	
C89	220	500	UCG-1036	1469-00025		5R5T25		MCB240		
C90	.0018	600	RCN-033	SI1800	D6-182		GP2-333-182	PT622		
C91	.01	600	UCC-040	P688-01	D6-103	PTE6S1	GP2-333-103	PT611	6TM-S1	
C92	.0039	600	RCN-034	1469-004		LDR5D5		MCB463		
C93	470	500	UCU-544	1468-0005	D6-471	5W5T5	GP2K-471	MC245	1FM-35	
C94	.05	400	UCC-045	P488-05	DF-503	PTE4S5		PT415	4TM-S5	
C95	.5	200	UCC-052	P288-5		PJ2P5		PT405	2TM-P5	
C96	180	1000	RCU-302					MCK318		
C97	.05	600	UCC-045	P688-05		PTE6S5		PT615	6TM-S5	
C98	.1	600	RCC-104	P688-1		PTE6P1		PT601	6TM-P1	
C99	3.6									
C100	12	500							MS-415	
C101	.5	200	UCC-052	P288-5		PJ2P5		PT405	2TM-P5	
C102	500	20000	RCN-035	HV20C	TV3-502	MM-C20T5				
C103	6		RCW-1002				NP0K-060			
C104	800		RCW-3037	BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	Note 7

Note 1. Some Models use 18MMF in this application (Part #UCG-2010)
Note 2. Some Models use 24MMF in this application (Part #RCW-3050)
Note 3. Some Models use .001MFD in this application (Part # UCC-035)
Note 4. Some Models use .015MFD in this application (Part #RCN-042)
Note 5. When V15 is 12AU7, C71 is .0033MFD (Part #RCN-045)
Note 6. When V15 is 12AU7, C76 is .04MFD
Note 7. Early Production only.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: General Electric PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	100KΩ	½	RRC-154	Q11-128	AG-49-S	B-40	U-41	Horiz. Hold Control
B	Shaft		Not Req.	Not Req.	RS-2	Not Req.	Not Req.	Attach to R1A
R2A	100KΩ	½	RRC-154	Q11-128	AG-49-S	B-40	U-41	Brightness Control
B	Shaft		Not Req.	Not Req.	RS-2	Not Req.	Not Req.	Attach to R2A
R3A	10KΩ	4	RRW-073		AI0-10K		MI0MP	Focus-Wire Wound
B	Shaft		Not Req.		RS-2		Not Req.	Attach to R3A
R4A	4000Ω	½	RRC-127	Q11-114	AM-80-S	AN-10	SU-14	Vert Linearity Control
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R4A
R5A	3 Meg	½	RRC-096	Q11-140	AM-85-S	AN-84	SU-59	Height Control
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R5A
R6A	125KΩ	½	RRC-163		AG-49-S	B-40	U-43	Vert Hold Control
B	Shaft		Not Req.		FKS-1/4	Not Req.	Not Req.	Attach to R6A
R7A	25KΩ		RRC-156	QJ-301 *		SBBT-706-S	UF253L	Contrast Control-Panel
B	2 Meg						UR36-T95	Volume Control-Tapped ②700KΩ-Rear
C	Switch		Not Req.				U8-26	Attach to R7B

* CONCENTRIKIT EQUIVALENT-KIT K-2, BASE ELEMENTS & SHAFTS B11-120 & P2-222(Panel) B13-139X & R2-306 (Rear) & SWITCH 76-1

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: General Electric PART No.	IRC PART No.	NOTES
R8	120	½	URD-027	BTS-120	
R9	18K	½	URD-079	BTS-18K	
R10	18K	½	URD-079	BTS-18K	
R11	5600Ω	1	URE-067	BTA-5600	Note 9
R12	1200Ω	½	URD-071	BTS-1200	
R13	10K	½	URD-073	BTS-10K	
R14	33Ω	½	URD-013		
R15	6800Ω	½	URD-069	BTS-6800	
R16	1000Ω	½	URD-049	BTS-1000	
R17	5600Ω	½	URD-067	BTS-5600	
R18	10K	½	URD-073	BTS-10K	
R19	220KΩ	½	URD-105	BTS-220K	
R20	1000Ω	½	URD-049	BTS-1000	
R21	8200Ω	½		BTS-8200	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: General Electric PART No.	IRC PART No.	NOTES
R22	3300Ω	½	URD-061	BTS-3300	
R23	2200Ω	½	URD-057	BTS-2200	
R24	100KΩ	½	URD-097	BTS-100K	
R25	47Ω 5%	1	URD-1017		
R26	1000Ω	½	URD-049	BTS-1000	
R27	100KΩ	½	URD-097	BTS-100K	
R28	5600Ω 5%	1	URD-1067		
R29	47Ω	½	URD-1017		
R30	1000Ω	½	URD-049	BTS-1000	
R31	20KΩ 5%	1	URD-1080	BTS-20K 5%	
R32	180Ω	½	URD-031	BTS-180	
R33	4700Ω	1	URE-065	BTA-4700	
R34	33 KΩ	½	URD-085		Note 1
R35	470Ω	½	URD-041	BTS-470	

RESISTORS (CONT.)

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: General Electric PART No.	IRC PART No.	NOTES
R36	3300Ω 5%	½	URD-1061	BTS-3300 5%	
R37	10KΩ	½	URD-073	BTS-10K	
R38	3300Ω	2	URF-061	BTB-3300	
R39	5100Ω 5%	1		BTA-5100 5%	Note 2
R40	6800Ω	1	URE-069	BTA-6800	Note 3
R41	22KΩ	2	URF-081	BTB-22K	
R42	5600Ω	½	URD-067	BTS-5600	
R43	100KΩ 5%	½	URD-1097	BTS-100K 5%	Note 4
R44	470KΩ	½	URD-113	BTS-470K	
R45	100KΩ	½	URD-097	BTS-100K	
R46	820KΩ	½	URD-119	BTS-820K	
R47	27KΩ	½	URD-083	BTS-27K	
R48	2.7Meg	½		BTS-2.7Meg	
R49	5100 5%	1		BTA-5100 5%	Note 2
R50	6800Ω	1	URE-069	BTA-6800	Note 3
R51	1Meg	½	URD-121	BTS-1Meg	
R52	100KΩ	½	URD-097	BTS-100K	
R53	100KΩ	½	URD-097	BTS-100K	
R54	6800Ω	1	URE-069		
R55	33KΩ	½	URD-085	BTS-33K	
R56	150KΩ	½	URD-101	BTS-150K	
R57	150KΩ	½	URD-101	BTS-150K	
R58	22KΩ	½	URD-081	BTS-22K	
R59	180Ω	½	URD-031	BTS-180	
R60	18KΩ	½	URD-079		
R61	4700Ω	1	URE-065		
R62	220KΩ	½	URD-105		
R63	47KΩ	½	URD-089		
R64	470KΩ	½	URD-113		
R65	1000Ω	½	URD-049	BTS-1000	
R66	100KΩ	½	URD-097	BTS-100K	
R67	100KΩ	½	URD-097	BTS-100K	
R68	22KΩ	½	URD-081	BTS-22K	
R69	22KΩ	½	URD-081	BTS-22K	
R70	82KΩ	½	URD-095	BTS-82K	
R71	6.8Meg	½	URD-141	BTS-6.8Meg	
R72	220KΩ	½	URD-105	BTS-220K	
R73	1000Ω	½	URD-049		
R74	470KΩ	½	URD-113	BTS-470K	
R75	150Ω	1	URE-029	BTA-150	
R76	1100Ω 5%	2	URF-1050	BTB-1100 5%	Note 5
R77	100Ω	½	URD-025	BTS-100	
R78	1100Ω 5%	2	URF-1050	BTB-1100 5%	
R79	27KΩ	2	URF-083	BTB-27K	
R80	8200Ω	1	URE-071	BTA-8200	
R81	47Ω 5%	½	URD-1017		
R82	680Ω	2	URF-045	BTB-680	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: General Electric PART No.	IRC PART No.	NOTES
R83	470K	½	URD-113	BTS-470K	
R84	10KΩ	½	URD-073	BTS-10K	
R85	3.9Meg	½	URD-133	BTS-3.9Meg	
R86	47KΩ	½	URD-089	BTS-47K	
R87	120KΩ	½	URD-099	BTS-120K	
R88	150KΩ	½	URD-101	BTS-150K	
R89	82KΩ	½	URD-095	BTS-82K	
R90	47KΩ	½	URD-089	BTS-47K	
R91	120KΩ	½	URD-099	BTS-120K	
R92	100KΩ 5%	½	URD-097	BTS-100K 5%	
R93	47KΩ	½	URD-089	BTS-47K	
R94	2.2Meg	½	URD-129	BTS-2.2Meg	
R95	18KΩ	½	URD-079	BTS-18K	
R96	220KΩ	½	URD-105	BTS-220K	
R97	150KΩ	½	URD-101	BTS-150K	Note 6
R98	680KΩ 5%	1		BTS-680K 5%	Note 3
R99	270Ω	1	URD-033	BTS-270	
R100	470Ω 5%	1	URE-041	BTA-470 5%	
R101	1200Ω	½	URD-051	BTS-1200	
R102	1Meg	½	URD-121	BTS-1Meg	
R103	1Meg	½	URD-121	BTS-1Meg	
R104	150KΩ	½	URD-101	BTS-150K	
R105	1Meg	½	URD-121	BTS-1Meg	
R106	68KΩ	½	URD-093	BTS-68K	
R107	47KΩ	½	URD-089	BTS-47K	
R108	47KΩ	½	URD-089	BTS-47K	
R109	220KΩ	½	URD-105	BTS-220K	
R110	180Ω	½	URD-031	BTS-180	
R111	68KΩ	½	URD-093	BTS-68K	
R112	27KΩ	½	URD-083	BTS-27K	
R113	470KΩ	½	URD-113	BTS-470K	
R114	22KΩ	½	URD-081	BTS-22K	
R115	82KΩ	½	URD-095	BTS-82K	
R116	150KΩ	½	URD-101	BTS-150K	
R117	22KΩ	½	URD-081	BTS-22K	
R118	2.2Meg	½	URD-129	BTS-2.2Meg	
R119	330Ω	½	URD-037		
R120	1.5Meg	½	URD-125	BTS-1.5Meg	
R121	250Ω	5	RRW-071	1 3/4A-250	
R122	150Ω	1	URE-029	BW-1-150	Note 7
R123	180Ω	1		BW-1-180	Note 3
R124	2400Ω	7	RRW-069	1 3/4A-2500	
R125	*		RRW-072		
R126	2200Ω 5%	1	URE-057	BTA-2200	
R127	220KΩ	1		BTA-220K	
R128	1Meg	1	URE-121		
R129	2000Ω	10	RRW-075	1 3/4A-2000	Note 8
R130	1000Ω	½	URD-049	BTS-1000	

Note 1. Some Models use a 18KΩ resistor in this application (Part #URD-079)
Note 2. Some Models use a 3000Ω resistor in this application (Part #URF-1080)
Note 3. Not used in all Models.
Note 4. Some Models use a 556KΩ resistor in this application (Part #URD-091)
Note 5. Some Models use a 330Ω resistor in this application (Part #URE-037)
Note 6. Some Models use 330KΩ resistor in this application (Part #URD-109)
Note 7. Some Models use 82Ω resistor in this application (Part #URF-023)
Note 8. Some Models use a 2350Ω resistor in this application (Part #URW-083)
Note 9. Early version models use a 3300Ω resistor in this application.
* Globar resistor, 15KΩ at 150V.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: General Electric PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
T1	117VAC ② 2.1A	530V AC .260A	5VAC ② 6A	6.3VAC ① 1.5A SEC. 4 12.6VAC ②4.5A	RTP-309				

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING: DC RESISTANCE PRI.	RATING: DC RESISTANCE SEC.	REPLACEMENT DATA: General Electric PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	NOTES
T2	400Ω Tap ② 40Ω	25Ω Tap ② 8Ω SEC. 2 0Ω	RTO-101					Horiz. Output Trans.
T3	700Ω	80Ω Tap ② 15Ω	RTO-102					Vert. Output Trans.
T4A	120Ω		RLD-037					Horiz. Deflection Coils
B	85Ω							Vert. Deflection Coils
T5	1400Ω		RLF-046					Focus Coil

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: General Electric PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	NOTES
T6	2.5KΩ	3.6Ω	230Ω	.3Ω	RTO-105	A-3849	A-3018	RO-2 ①	S-1X	① Drill one new mtg. hole.

SPEAKER

ITEM No.	RATINGS: SIZE	RATINGS: FIELD	RATINGS: V. C. IMP.	REPLACEMENT DATA: General Electric PART No.	JENSEN PART No.	QUAM PART No.	NOTES
SP1	12"	PM	3.6Ω	S1212D-2		12J11	

PARTS LIST AND DESCRIPTIONS (Continued)

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA				
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ~)	General Electric PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
L1	.200A	70Ω	3.5 Hy.	RLF-045	C-2325 ①		TR-3300	C-25A ①

① Drill one new mtg. hole.

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA			NOTES
		PRI.	SEC.	General Electric PART No.	MERIT PART No.	IRC PART No.	
L2	Ant. Trans.	0Ω	0Ω	RLA-037			
L3	RF Choke	0Ω		RLI-146			
L4	Ant. Coil	0Ω					
L5	IF Trap	.1Ω		RLI-159			
L6	Fil. Choke	4Ω		RLI-144		CLA	5.6 Microhenries
L7	1st.RF Plate Coils	0Ω					
L8	RF Coil	0Ω					
L9	2nd. RF Grid Coils	0Ω					
L10	2nd.RF Plate Coils	0Ω					
L11	Osc. Coils	0Ω					
L12	Cath.Choke	.2Ω		RLI-136			
L13	Conv.Plate	0Ω	.1Ω	RTL-126			
L14	1st.Video IF	.1Ω	.1Ω	RTL-125			Includes Trap
L15	2nd.Video IF	.1Ω		RLP-018			Includes Trap
L16	3rd.Video IF	.1Ω		RLP-019			Includes Trap
L17	Sound Take-off	2.3Ω		RLI-151	TV-151		
L18	Peaking Coil	14Ω					
L19	Peaking Coil	5.4Ω		RLI-148	♦TV-184		Wound on 18KΩ resistor
L20	Peaking Coil	6.3Ω		RLI-149	TV-185		
L21	Peaking Coil	10.5Ω		RLI-150			Wound on 56KΩ resistor
L22	Sound IF	4.5Ω	4.5Ω	RTM-008	†TV-108		
L23	Ratio Det.	3.4Ω	.6ΩCT	RTD-011	*TV-110		270Ω resistor in series with tertiary winding
L24	Fil. Choke	.1Ω		RLI-142			
L25	Horiz. Osc.	95Ω		RLC-091			Tap @ 55Ω
L26	Width Coil	80Ω	80Ω	RLD-031			
L27	Horiz. Lin.	22Ω		ALD-027			
L28	Anti-ringing Coil	8.2Ω		RLI-138		CL-1	10 Microhenries
L29	Anti-ringing Coil	8.2Ω		RLI-138		CL-1	10 Microhenries

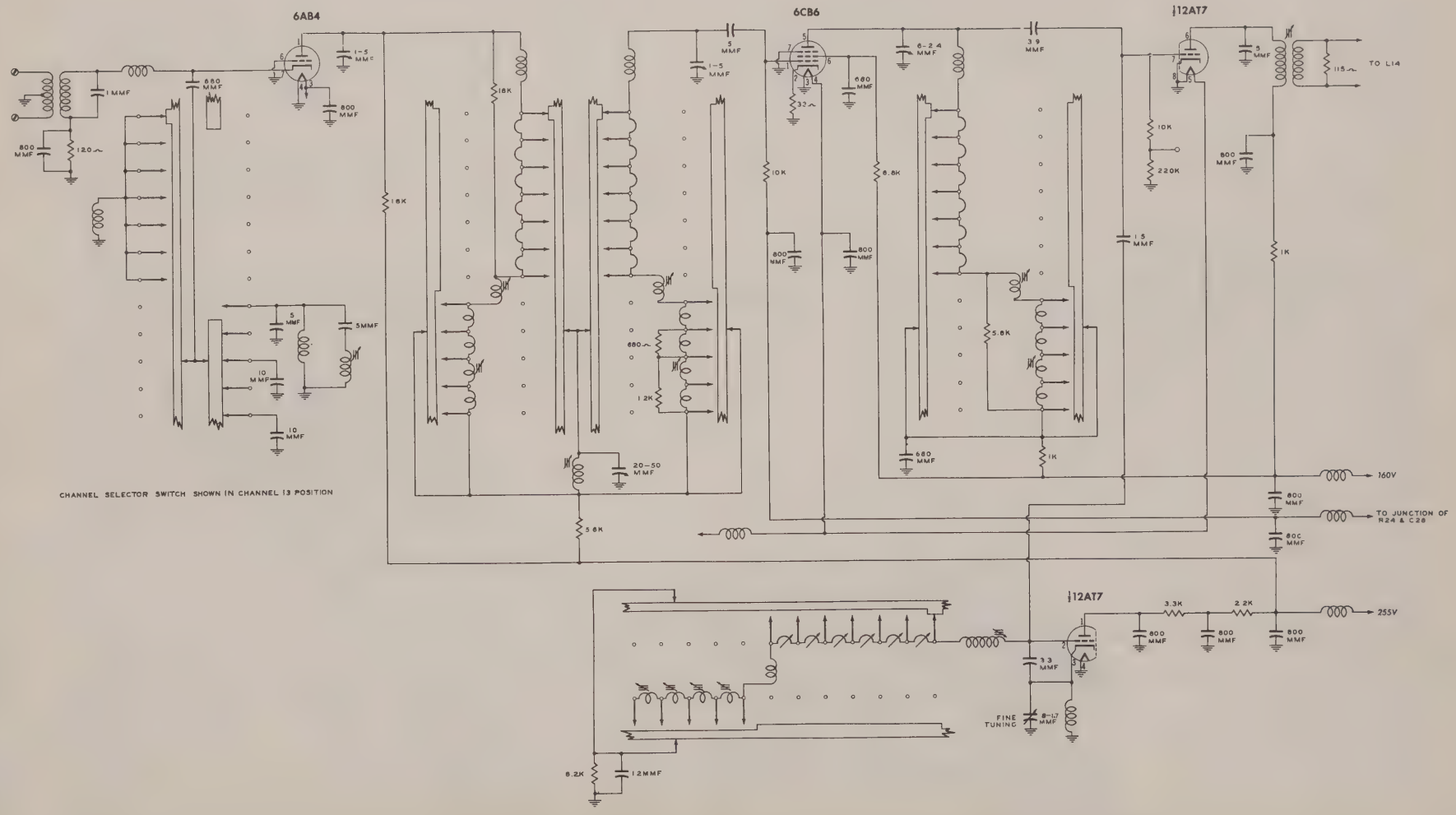
* Add 270Ω resistor in series with audio tap.
† Drill new mtg. holes
♦ Parallel with 18KΩ resistor

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA.					
			General Electric PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	GJV Pigtail	1/4A-250V	RFE-006		318.250 (3AG-P/T)		GJV 1/4	

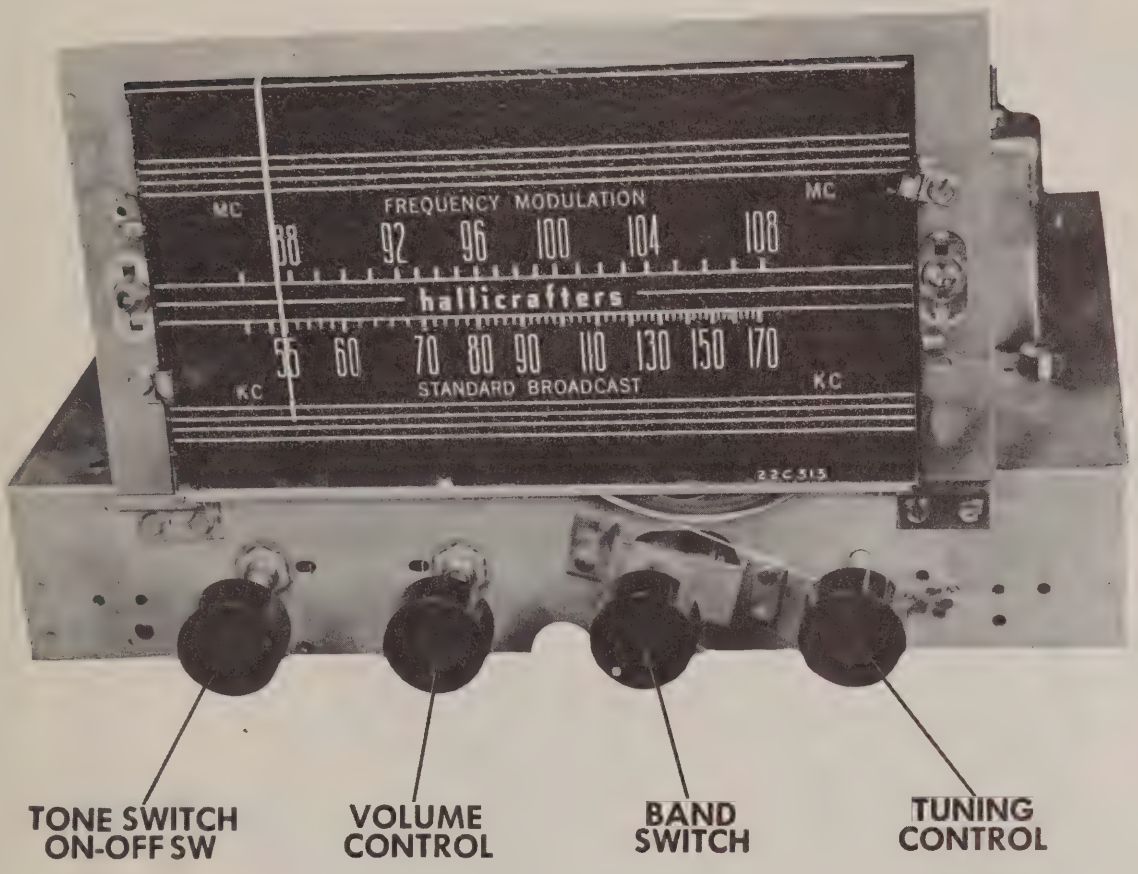
MISCELLANEOUS

ITEM No.	PART NAME	General Electric PART No.	NOTES
M2A	RF Tuner		
B	RF Tuner	RJX-044D	"D" Version
M3	4th. Video IF		Includes Trap
	Crystal	1N64	1N64
	RF Choke		Video Det. Assy. Part #RLX-033
	Capacitor		82MMF
	Capacitor	RCN-029	9MMF
M4	Switch	RSS-005	TV - Phono
M5	Ion Trap	RET-003	
B5	Trimmer	RCY-069	1-12MMF (Yoke Balancing)
B2	Trimmer	RCY-068	100-480 (Horiz. Drive)
	Switch Wafer	RSX-023	(Complete) Ant. Coils
	Switch Wafer	RSX-022	(Complete) 1st.RF Plate Coils
	Switch Wafer	RSX-021	(Complete) 2nd.RF Grid Coils
	Switch Wafer	RSX-020	(Complete) 2nd. RF Plate Coils
	Switch Wafer	RSX-019	(Complete) Osc. Coils
	Escutcheon	RDE-112	Knob
	Knob	RDK-222	Fine Tuning (Fawn)
	Knob	RDK-224	Channel Selector (Fawn)
	Knob	RDK-223	Off/On Volume (Fawn)
	Knob	RDK-225	Contrast (Fawn)
	Knob	RDK-244	Focus, brightness, vert. hold and horiz. hold (4 required)
	Back Cover	RAB-158	
	Escutcheon	RDE-110	
	Safety Glass	RDW-047	
	Gasket	RIG-003	Dust Seal
	Mask	RDE-111	



ALTERNATE TUNER SCHEMATIC

HALLICRAFTERS
MODEL S-78A (Run 1)



HALLICRAFTERS
MODEL S-78A (Run 1)

TRADE NAME	Hallicrafters Model S-78A (Run 1)		
MANUFACTURER	Hallicrafters Co., 4401 W. 5th. Ave., Chicago 24, Ill.		
TYPE SET	AC Operated AM-FM Superheterodyne Receiver		
TUBES (ELEVEN)	Types 6CB6 FM RF Amp., 6BA6 FM AM Mixer, 6J6 FM AM Osc.-AFC, 6BA6 1st. IF Amp., 6SH7 2nd. IF Amp., 6SH7 Limiter-AM Det.-AVC, 6H6 Ratio Det., 6SJ7 AF Amp., (2) 6K6GT Audio Output, 5Y3GT Rectifier.		
POWER SUPPLY	110-120 Volts	RATING	.42 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	540-1750KC	FREQ. MOD.	88-108MC

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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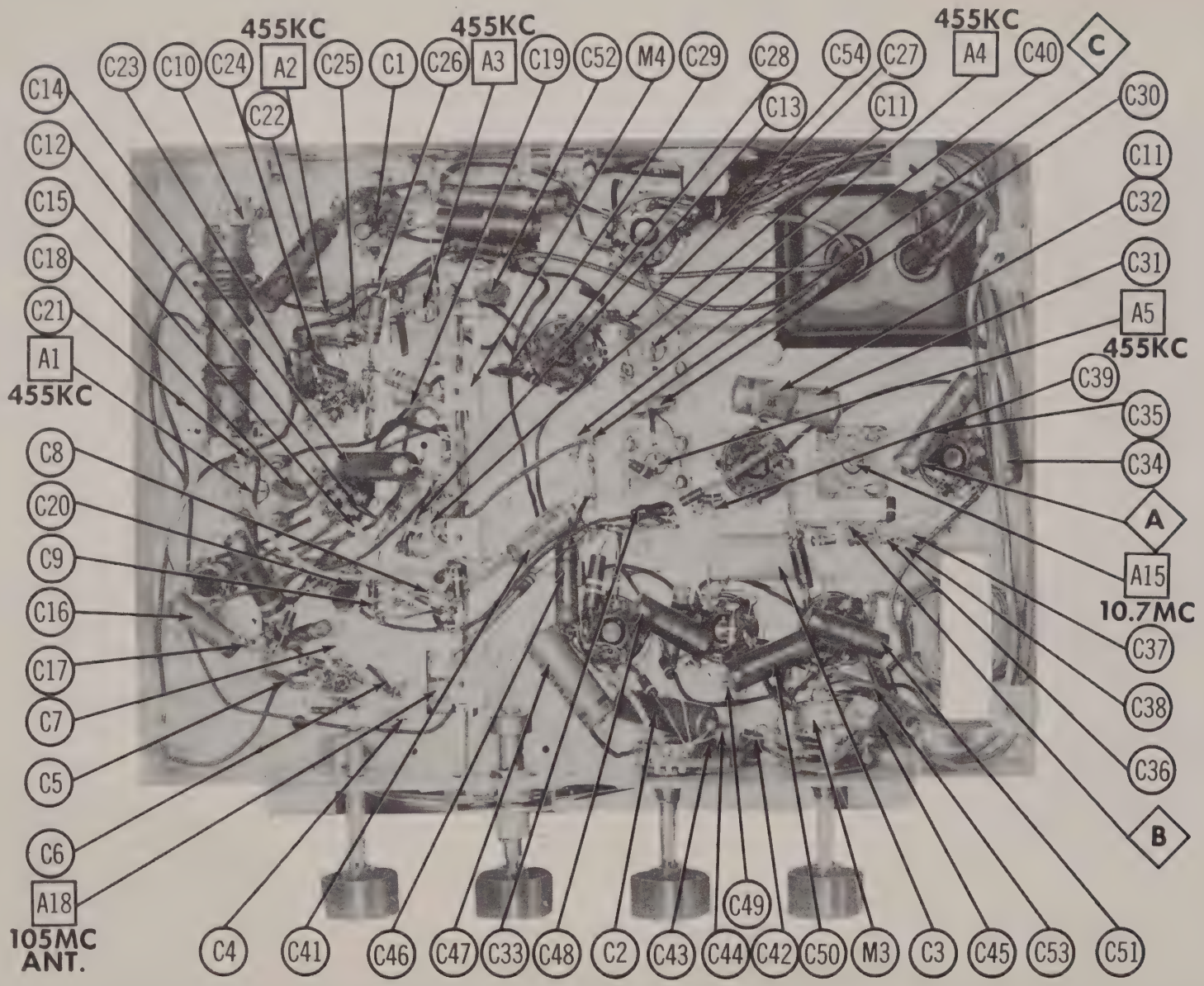
455KC
455KC
455KC
C23
C10
C24
A2
C25
C1
C26
A3
C19
C52
M4
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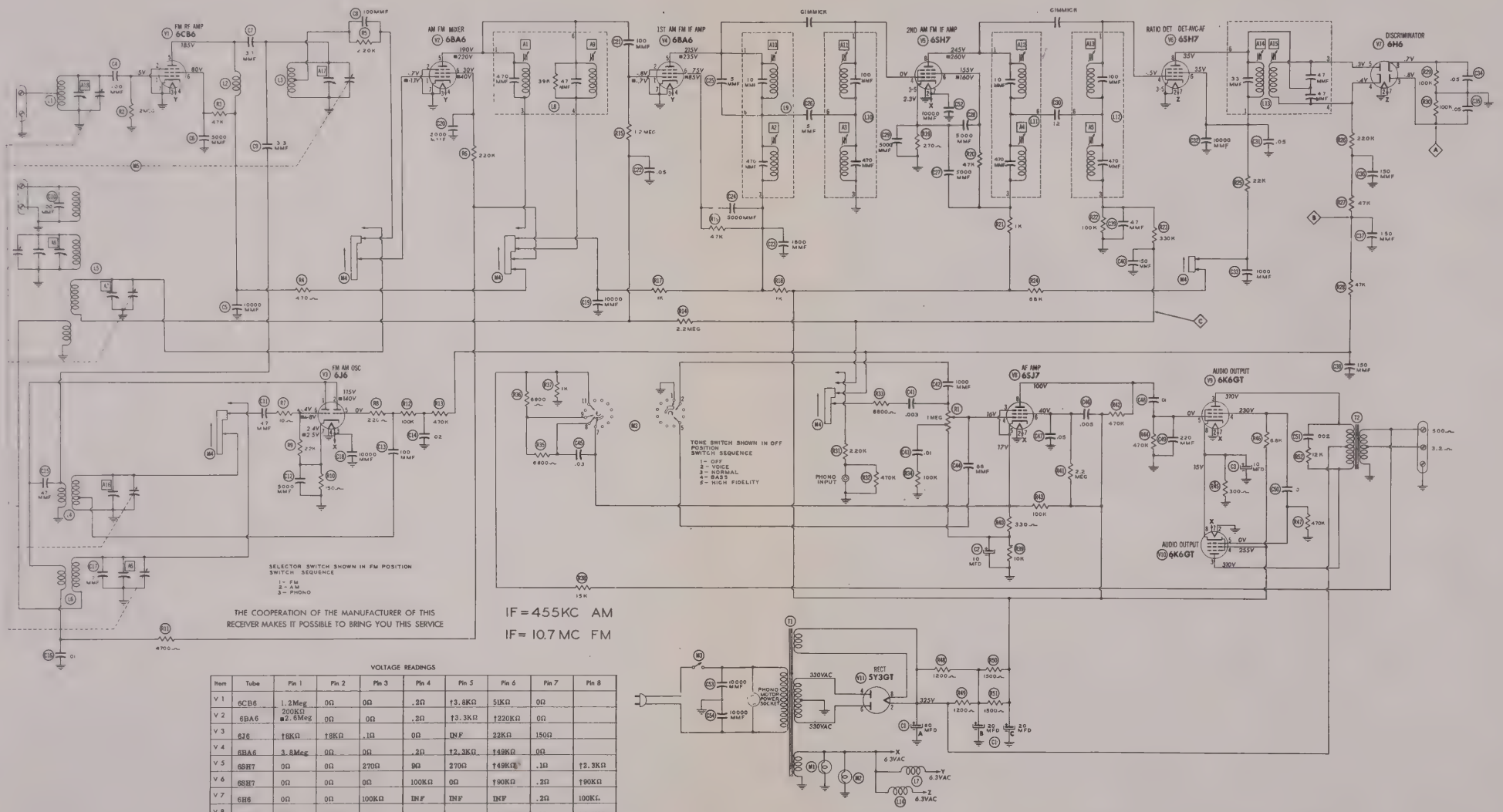
C28
C54
C27
A4
C40
C
C14
C22
C13
C11
C30
C12
C11
C15
C32
C18
C31
C21
A5
455KC
A1
455KC
C39
C35
C8
C34
C20
A
C9
A15
10.7MC
C16
C37
C17
C38
C7
C36
C5
B
C6
A18
105MC
ANT.
C49
C4
C41
C46
C47
C33
C48
C2
C43
C44
C42
C50
M3
C3
C45
C53
C51



THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

IF = 455KC AM

IF = 10.7 MC FM

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	6CB6	1.2Meg 200KΩ	0Ω	0Ω	.2Ω	†3.8KΩ	51KΩ	0Ω	
V 2	6BA6	■2.6Meg	0Ω	0Ω	.2Ω	†3.3KΩ	†220KΩ	0Ω	
V 3	6J6	†8KΩ	†8KΩ	.1Ω	0Ω	INF	22KΩ	150Ω	
V 4	6BA6	3.8Meg	0Ω	0Ω	.2Ω	†2.3KΩ	†49KΩ	0Ω	
V 5	6SH7	0Ω	0Ω	270Ω	9Ω	270Ω	†49KΩ	.1Ω	†2.3KΩ
V 6	6SH7	0Ω	0Ω	0Ω	100KΩ	0Ω	†90KΩ	.2Ω	†90KΩ
V 7	6H6	0Ω	0Ω	100KΩ	INF	INF	INF	.2Ω	100KΩ
V 8	6SJ7	0Ω	0Ω	5KΩ	6KΩ	6KΩ	†2.2Meg	.1Ω	†470KΩ
V 9	6K6GT	0Ω	0Ω	†350Ω	†8.1KΩ	470KΩ	INF	.1Ω	300Ω
V 10	6K6GT	0Ω	0Ω	†350Ω	†1.3KΩ	470KΩ	†12KΩ	.1Ω	300Ω
V 11	5Y3GT	†600Ω	55KΩ	INF	6Ω	INF	59Ω	INF	55KΩ

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS NOTED
■ MEASURED IN "AM" POSITION
† MEASURED FROM PIN 2 OF V11
TONE CONTROL IN "VOICE" POSITION (OFF/VOICE-NORMAL-BASE-HI-FI)

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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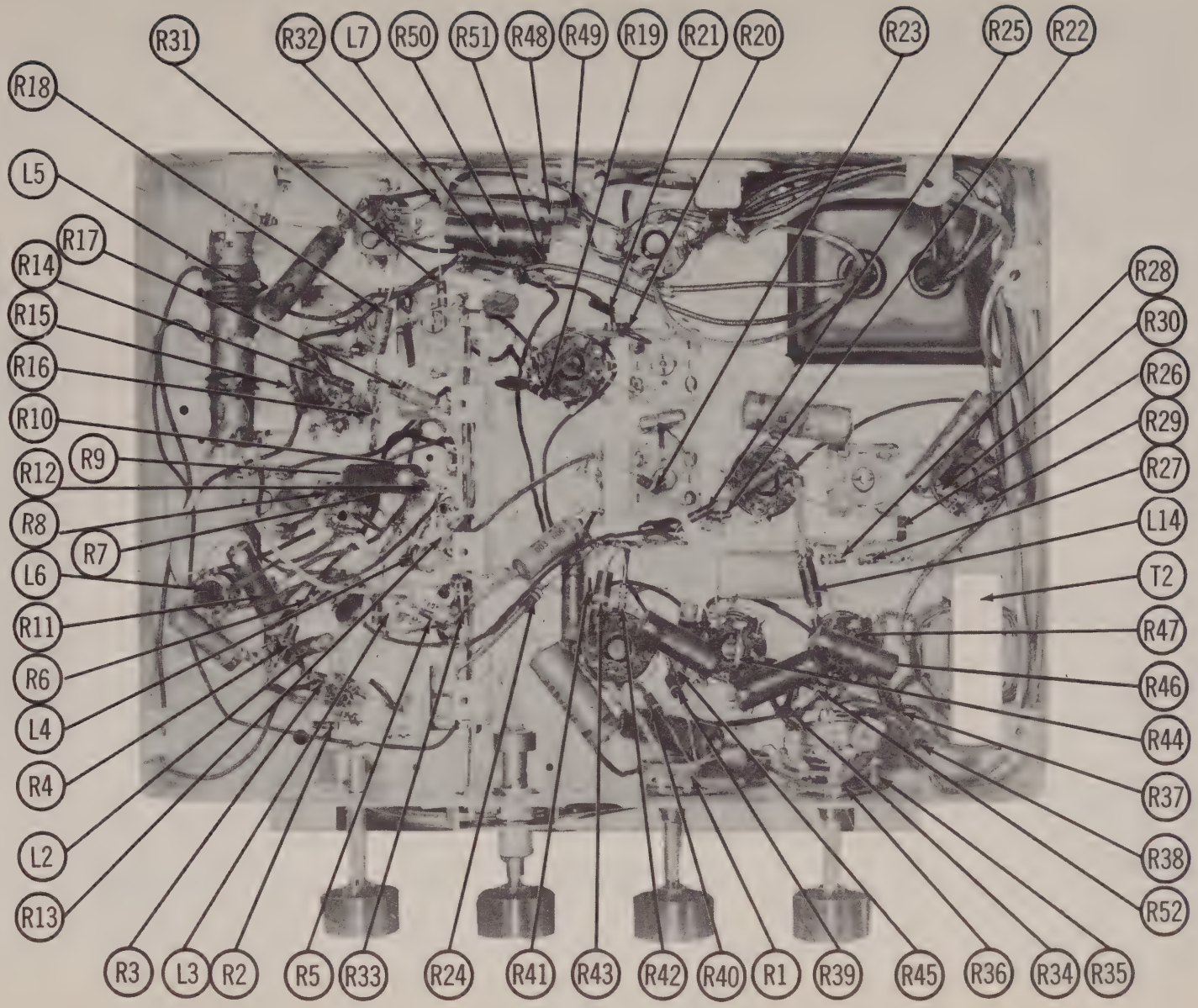
180-6



PROPERTY OF
L.C.F.D.
3924
DENVER, COLO.
DEPARTMENT

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

AM ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher thant necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Set the tone control at "Normal".

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	High side to stator lug on middle AM section of tuning gang. Low side to chassis.	455KC (400% Mod)	BC	1000KC	Across voice coil.	A1, A2, A3, A4, A5	Adjust for maximum output.
2.	RMA dummy (fig 1)	High side thru dummy to AM antenna terminal "A" Low side to terminal "G".	1500KC	"	1500KC	"	A6, A7, A8	Adjust in order given for maximum output.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

When adjusting A10 thru A13 shunt a 4700Ω resistor across the secondary when adjusting the primary, then shunt the same resistor across the primary when adjusting the secondary. Remove the resistor after completing the alignment.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
3.	.01MFD	High side to stator lug on middle FM section of tuning gang. Low side to chassis.	10.7MC (Unmod)	FM	90MC	DC Probe to point (A). Common to chassis.	A9, A10, A11, A12, A13, A14	Adjust for maximum deflection See note above concerning shuning resistor. Alternate signal generator output to maintain approximately 12volts DC at WTVM.
4.	"	"	"	"	"	DC probe to point (B). Common to chassis	A15	Adjust for zero reading. A positive and negative reading will be obtained on either side to the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	SCOPE CONNECT	ADJUST	REMARKS
3.	.01MFD	High side to stator lug on middle FM section of tuning gang. Low side to chassis.	10.7MC (450KC Swp)	FM	90MC	Vert Amp to point (C). Low side to chassis.	A9, A10, A11, A12, A13	Adjust for curve of maximum amplitude and symmetry as per fig 2. Attentuate generator output to avoid limiter action.
4.	"	"	"	"	"	Vert amp to point (B). Low side to chassis.	A14, A15	Adjust A14 for maximum amplitude and strightness of crossover lines. Adjust A15 so that 10.7MC occures at center of crossover lines as per fig 3, then SLIGHTLY retouch A14 as above.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
5.	270Ω Carbon resistor	High side thru 270Ω to one FM antenna terminal. Low side to other terminal.	105MC (Unmod)	FM	105MC	DC probe to point (C). Common to chassis.	A16, A17, A18	Before making these adjustments disable the AFC by shorting across C14 to chassis. Adjust in order given for maximum deflection. Attenuate gen generator output to maintain approximately 1 volt DC of VTVM.

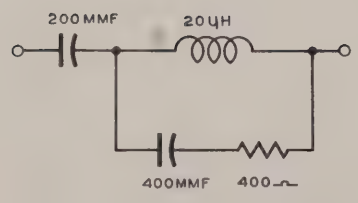


FIG. 1

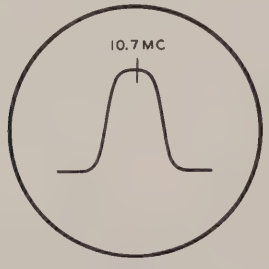


FIG. 2

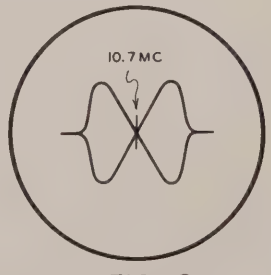


FIG. 3

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

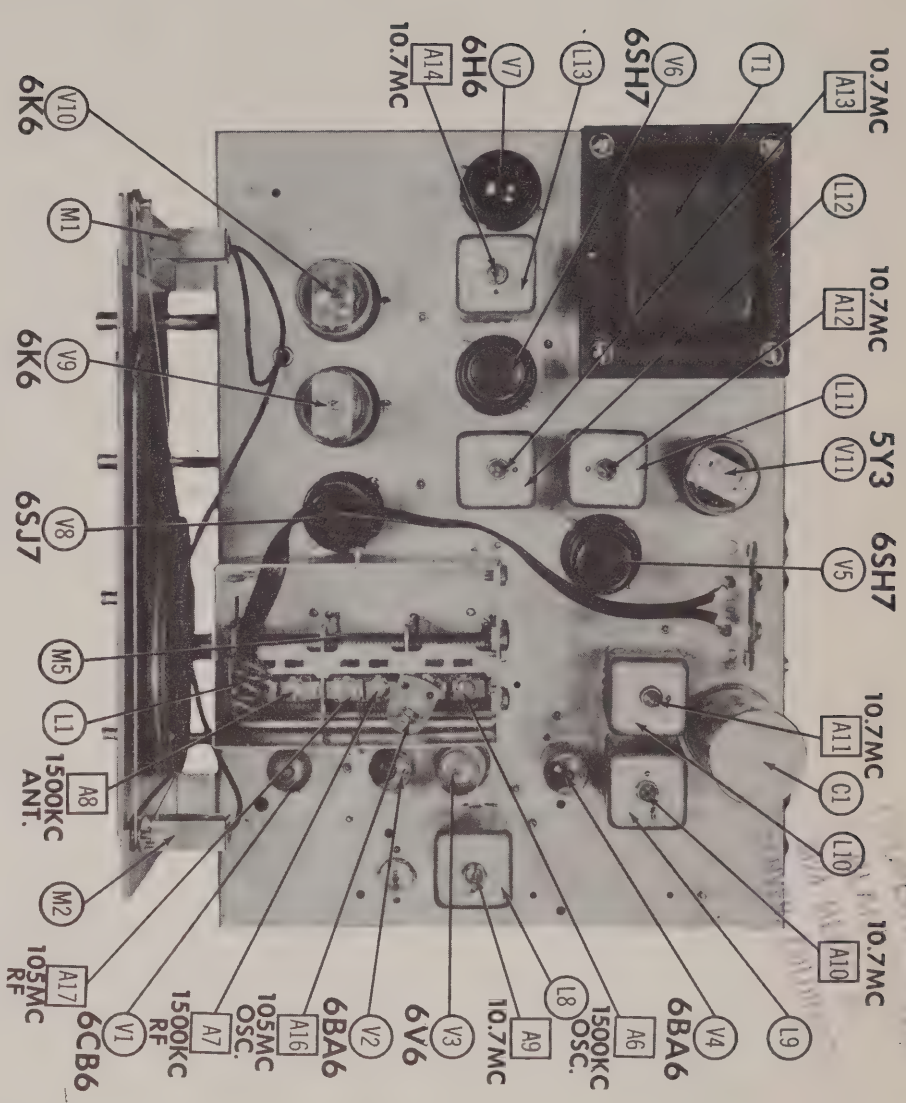
ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	NOTES
		Hallicrafters PART No.	STANDARD REPLACEMENT		
V1	FM RF Amplifier	90X6CB6	6CB6	7CM	
V2	FM AM Mixer	90X6BA6	6BA6	7BK	
V3	FM AM Oscillator AFC	90X6J6	6J6	7BF	
V4	1st. FM AM IF Amp	90X6BA6	6BA6	7BK	
V5	2nd. FM AM IF Amp	90X6SH7	6SH7	8BK	
V6	Limiter-AM Det.-AVC	90X6SH7	6SH7	8BK	
V7	Ratio Detector	90X6H6	6H6	7Q	
V8	AF Amplifier	90X6SJ7	6SJ7	8N	
V9	Audio Output	90X6K6GT	6K6GT	7S	
V10	Audio Output	90X6K6GT	6K6GT	7S	
V11	Rectifier	90X5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA Hallicrafters PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	▲60	450	45B113	AFH3-45		UPT62245		FP391.1	TVL-3789	
B	■20	450								
C	▲20	450								
C2	10	25	45A121	PRS25/10		BR102A		TC22	TVA-1204	
C3	10	25	45A121	PRS25/10		BR102A		TC22	TVA-1204	
C4	100		47B20101M5	SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C5	10000		47A217	BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C6	5000		47A168	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C7	33		47X20UK330K	SI33	D6-330		GP1K-330	UC-5433	5GA-Q33	
C8	100		47B20101M5	SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C9	3.3		47A160-5	SI.3.3NP0	TCZ-3.3		NP0K-3R3	ZT-5533	5TCCB-V33	
C10	100		47B20101M5	SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C11	47		47X20UK470M	SI47N750	TCN-47		N750K-470	NT-5447	5TCU-Q47	
C12	5000		47A168	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C13	100		47B20101M5	SI100NP0	TCZ-1000		NP0-333-101	ZT-531	5TCC-T1	
C14	.02	400	46AU203J	P488-02	DF-203	PTE4S2		PT412	4TM-S2	
C15	47		47X20UK470M	SI47N750	TCN-47		N750K-470	NT-5447	5TCU-Q47	
C16	.01	600	46AZ103F	P688-01	D6-103	PTE6S1	GP2-333-103	PT611	6TM-S1	
C17	7		47X20UJ070K				N750K-070			
C18	10000		47A217	BPD-01	DD-103	TM5S1	821-01	DC-521	5HK-S1	
C19	10000		47A217	BPD-01	DD-103	TM5S1	821-01	DC-521	5HK-S1	
C20	5000		47A168	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C21	100		47B20101M5	SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C22	.05	200	46AU503J	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C23	1800	500	47B35182K5							
C24	5000		47A168	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C25	5		47X20UK050K	SI5N750			N750K-050	NT-555	5TCUB-V5	
C26	5		47X20UK050K	SI15N750			N750K-050	NT-555	5TCUB-V5	
C27	5000		47A168	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C28	5000		47A168	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C29	5000		47A168	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C30	12	500	47B20120K5							
C31	.05	600	46AY503J	P688-05	DF-503	PTE6S5		PT615	6TM-S5	
C32	10000		47A217	BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C33	1000		47B20102M5	SI1000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C34	.05	200	46AU503J	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C35	.05	200	46AU503J	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C36	150		47B20151M5	SI150	D6-151	TM5T15	GP2K-151	UC-5315	5GA-T15	
C37	150		47B20151M5	SI150	D6-151	TM5T15	GP2K-151	UC-5315	5GA-T15	
C38	150		47B20151M5	SI150	D6-151	TM5T15	GP2K-151	UC-5315	5GA-T15	
C39	47		47X20UK470M	SI47	D6-470	TM5Q5	GP1K-470	UC-5447	5GA-Q47	
C40	150		47B20151M5	SI150	D6-151	TM5T15	GP2K-151	UC-5315	5GA-T15	
C41	.003	600	46AZ302J	P688-003	D6-302	PTE6D3	GP2-333-302	PT623	6TM-D3	
C42	1000		47B20102M5	SI1000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C43	.01	600	46AZ103F	P688-01	D6-103	PTE6S1	GP2-333-103	PT611	6TM-S1	
C44	68		47B20680M5	SI68	D6-680		GP1K-680	UC-5468	5GA-Q68	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA Hallicrafters PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C45	.03	200	46AU303J	P488-03				PT413	6TM-S3	
C46	.005	600	46AZ502J	P688-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5	
C47	.05	600	46AY503J	P688-05	DF-503	PTE6S5		PT615	6TM-S5	
C48	.01	600	46AZ103F	P688-01	D6-103	PTe6S1	GP2-333-103	PT611	6TM-S1	
C49	220		47B20221M5	SI220	D6-221	5W5T25	GP2K-221	UC-5322	5GA-T22	
C50	.01	600	46AZ103F	P688-01	D6-103	PTE6S1	GP2-333-103	PT611	6TM-S1	
C51	.002	600	46AZ202J	P688-002	D6-202	PTE6D2	GP2-333-202	PT622	6TM-D2	
C52	10000		47A217	BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C53	10000		47A217	BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C54	10000		47A217	BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA Hallicrafters PART No.	IRC PART No.	CLAKOSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	2Meg	½	25B623	Q17-139X	AT-119	BT-81	UT-448	Volume - Tapped @ 220KΩ
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Not Req.	Attach to R1A

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Hallicrafters PART No.	IRC PART No.	NOTES
R2	1.2Meg	½		BTS-1.2Meg	Note
R3	47KΩ	½	23X20X473M	BTS-47K	
R4	470Ω	½	23X20X471M	BTS-470	
R5	220KΩ	½	23X20X224M	BTS-220K	
R6	220KΩ	½	23X20X224M	BTS-220K	
R7	10Ω	½	23X20X100M		
R8	220Ω	½	23X20X221M		
R9	22KΩ	½	23X20X223M	BTS-22K	
R10	150Ω	½	23X20X151K	BTS-150	
R11	4700Ω	2	23X40X472M	BTB-4700	
R12	100KΩ	½	23X20X104M	BTS-100K	
R13	470KΩ	½	23X20X474M	BTS-470K	
R14	2.2Meg	½	23X20X225M	BTS-2.2Meg	
R15	1.2Meg	½		BTS-1.2Meg	Note
R16	47KΩ	½	23X20X473M	BTS-47K	
R17	1000Ω	1	23X30X102K	BTA-1000	
R18	1000Ω	1	23X30X102K	BTA-1000	
R19	270Ω	½	23X20X271K	BTS-270	
R20	47KΩ	½	23X20X473M	BTS-47K	
R21	1000Ω	½	23X20X102M	BTS-1000	
R22	100KΩ	½	23X20X104M	BTS-100K	
R23	330KΩ	½	23X20X334M	BTS-330K	
R24	68KΩ	½	23X20X683M	BTS-68K	
R25	22KΩ	½	23X20X223M	BTS-22K	
R26	220KΩ	½	23X20X224M	BTS-220K	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA PART No.	IRC PART No.	NOTES
R27	47KΩ	½	23X20X473M	BTS-47K	
R28	47KΩ	½	23X20X473M	BTS-47K	
R29	100KΩ	½	23X20X104K	BTS-100K	
R30	100KΩ	½	23X20X104K	BTS-100K	
R31	220KΩ	½	23X20X224M	BTS-220K	
R32	470KΩ	½	23X20X474M	BTS-470K	
R33	6800Ω	½	23X20X682M	BTS-6800	
R34	100KΩ	½	23X20X104M	BTS-100K	
R35	6800Ω	½	23X20X682M	BTS-6800	
R36	6800Ω	½	23X20X682M	BTS-6800	
R37	1000Ω	½	23X20X102M	BTS-1000	
R38	15KΩ	½	23X20X153K	BTS-15K	
R39	10KΩ	½	23X20X103K	BTS-10K	
R40	330Ω	½	23X20X331K	BTS-330	
R41	2.2Meg	½	23X20X225M	BTS-2.2Meg	
R42	470KΩ	½	23X20X474M	BTS-470K	
R43	100KΩ	1	23X30X104K	BTA-100K	
R44	470KΩ	½	23X20X474M	BTS-470K	
R45	300Ω	2	23X40X301J		
R46	6800Ω	½	23X20X682M	BTS-6800	
R47	470KΩ	½	23X20X474M	BTS-470K	
R48	1200Ω	2	23X40X122K	BTB-1200	
R49	1200Ω	2	23X40X122K	BTB-1200	
R50	1500Ω	2	23X40X152K	BTB-1500	
R51	1500Ω	2	23X40X152K	BTB-1500	
R52	12KΩ	½	23X20X123K	BTS-12K	

Note : Some Models use a 1Meg resistor in this application.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA Hallicrafters PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
T1	117VAC @ .42A	660VCT .100ADC	5VAC @ 2A	6.3VAC @3.25A	52C152	PM8410	P-2954	PH120B	R-14B

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA Hallicrafters PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	NOTES
T2	6.8KΩ CT	500Ω tap @ 3.2Ω	700Ω CT	26Ω tap @ .28Ω	55B158					

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

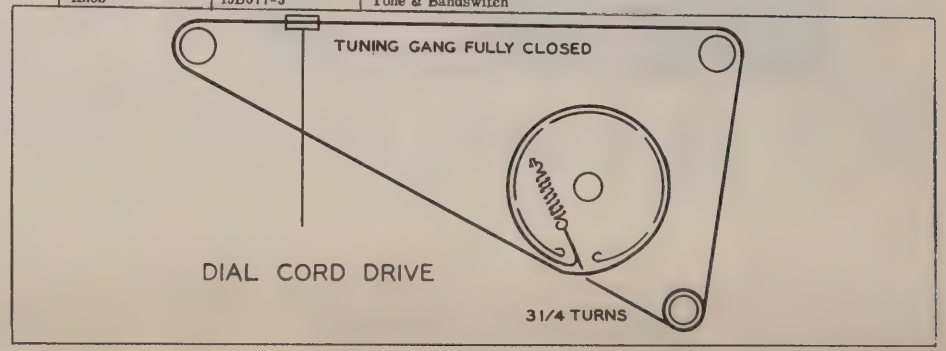
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA Hallicrafters PART No.	REPLACEMENT DATA MERIT PART No.	NOTES
L1	FM Ant. Coils	0Ω		51A1485		
L2	FM RF Coil	0Ω		53A124		
L3	FM RF Coil	0Ω		51B1022		
L4	FM Osc. Coil	0Ω	0Ω	51B1486		
L5	AM Ant. Coil	38Ω	5.5Ω & 10.5Ω	51B1059		
L6	AM Osc. Coil	1.5Ω	6.5Ω	51B1020		
L7	Fil. Choke	.2Ω		53A123		
L8A	FM Mixer Plate Coil	8.5Ω		50B523		
B	AM Mixer Plate Coil	.2Ω				
L9A	1st. FM IF Plate Coil	.6Ω		50B407		
B	1st. AM IF Plate Coil	8.8Ω				
L10A	2nd. FM IF Grid Coil	.2Ω		50B408		
B	2nd. AM IF Grid Coil	8.8Ω				
L11A	2nd. FM IF Plate Coil	.6Ω		50B407		
B	2nd. AM IF Plate Coil	8.8Ω				
L12A	FM Limiter Coil	.2Ω		50B408		
B	AM Det. Coil	8.8Ω				
L13	Ratio Det. Trans.	.2Ω	.8Ω	50B410		
L14	Fil. Choke	.2Ω		53A123		

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA Hallicrafters PART No.		NOTES
M1	Bayonet	6-8	.25	Blue	39A003		Type #47
M2	Bayonet	6-8	.25	Blue	39A003		Type #47

MISCELLANEOUS

ITEM No.	PART NAME	Hallicrafters PART No.	NOTES
M3	Switch	60B319	On/Off - Tone
M4	Switch	60B462	Function Selector
M5	3 Gang Var. Cap.	48C277	(24-528MMF, 24-528MMF, 22-270MMF)
A16	Trimmer	44A115	FM Osc. Adj. (4-20MMF)
	Dial Scale	22C313	
	Pointer	82A147	
	Knob	15B068-3	Volume & Tuning
	Knob	15B077-3	Tone & Bandswitch



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MODEL 1008

HALLICRAFTERS MODELS 1000 (Ch. W1000D), 1008 (Ch. X1000D), 1019, (Ch. Z1000D)

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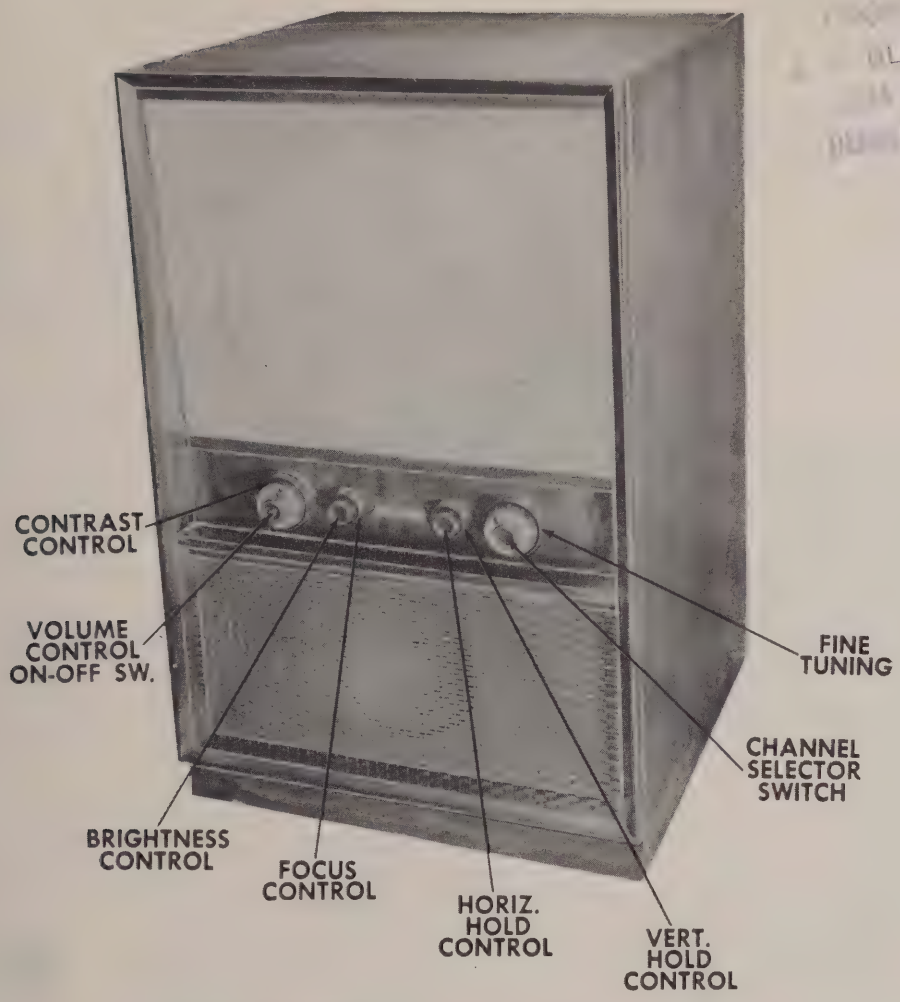

HALLICRAFTERS MODELS 1000 (Ch. W1000D), 1008 (Ch. X1000D), 1019, (Ch. Z1000D)

HALLICRAFTERS 1008

TRADE NAME	Hallicrafters Models 1000 (Ch. W1000D, Run 1), 1008 (Ch. X1000D, Runs 1 & 2), 1019 (Ch. Z1000D, Run 1)
MANUFACTURER	Hallicrafters Co., 4401 W. 5th. Ave., Chicago 24, Ill.
TYPE SET	Television Receiver
TUBES	Twenty-one
POWER SUPPLY	110-120 Volts AC-60 Cycle
RATING	1.75 Amp. @ 117 Volts AC
TUNING RANGE— Channels	2 thru 13

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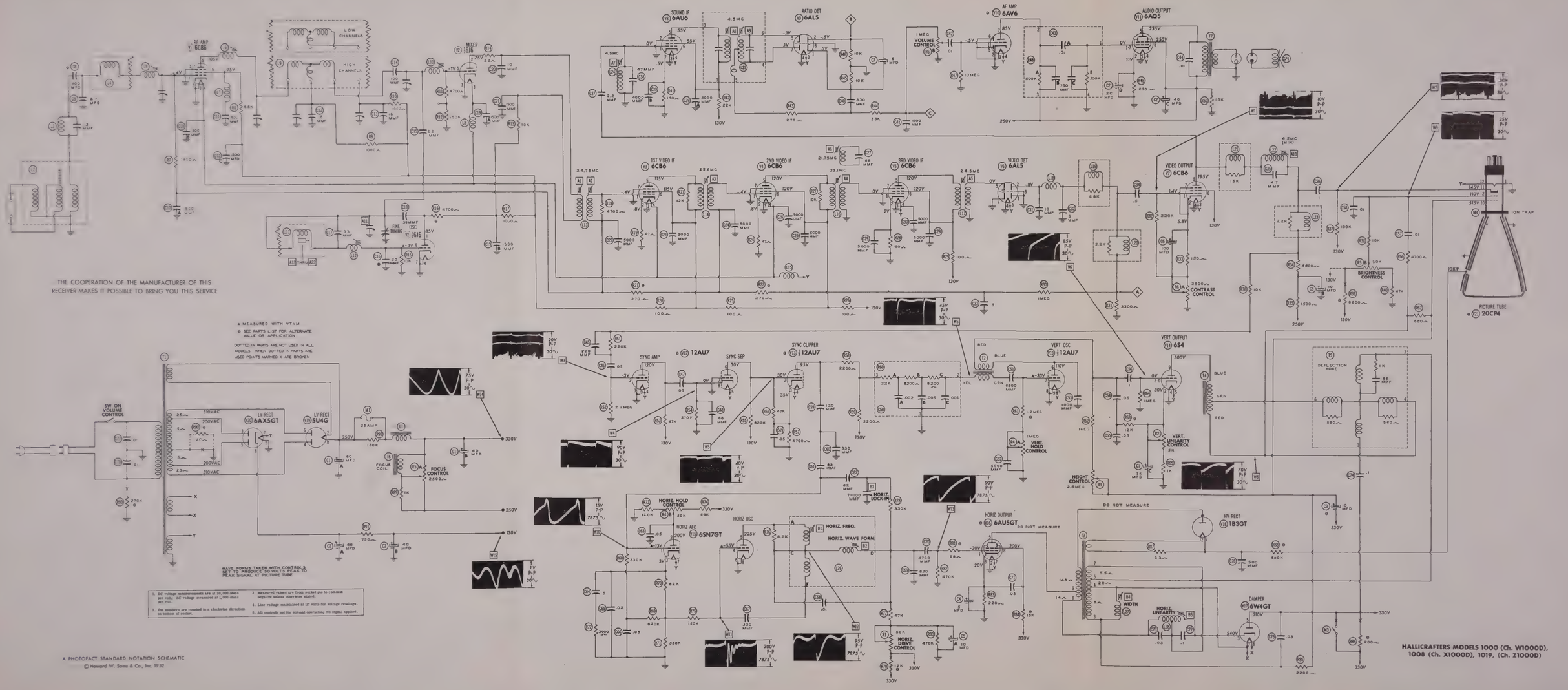
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
A MEASURED WITH VTVM
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DOTTED IN PARTS ARE NOT USED IN ALL MODELS. WHEN DOTTED IN PARTS ARE USED POINTS MARKED X ARE BROKEN
WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 80 VOLTS PEAK TO PEAK SIGNAL AT PICTURE TUBE
1. DC voltage measurements are at 20,000 ohms per volt; AC voltage measured at 1,000 ohms per volt.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3 Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation; No signal applied.
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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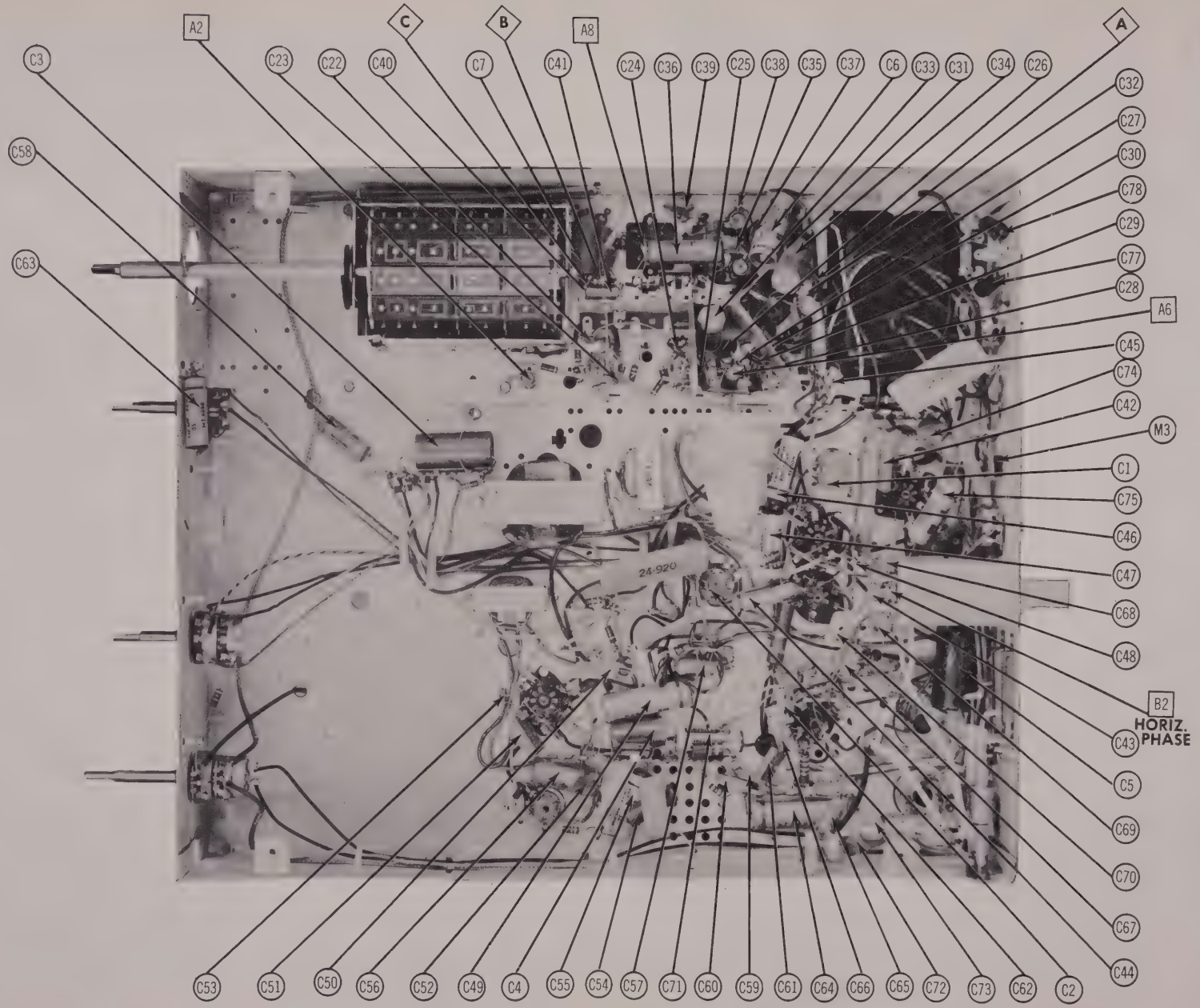
SOUND IF V3 6AU6
RATIO DET V9 6AL5
AF AMP V10 6AV6
AUDIO OUTPUT V11 6AQ5
RF AMP V1 6CB6
MIXER V2 6J6
OSC V2 6J6
1ST VIDEO IF V3 6CB6
2ND VIDEO IF V4 6CB6
3RD VIDEO IF V5 6CB6
VIDEO DET V6 6AL5
VIDEO OUTPUT V7 6CB6
PICTURE TUBE V22 20CP4
SYNC AMP V13 12AU7
SYNC SEP
SYNC CLIPPER V13 12AU7
VERT OSC V21 12AU7
VERT OUTPUT V14 6S4
HORIZ AFC V15 6SN7GT
HORIZ OSC
HORIZ OUTPUT V16 6AU5GT
LV RECT V18 6AX5GT
LV RECT V18 5U4G
HV RECT V18 1B3GT
DAMPER V17 6W4GT
VOLUME CONTROL
FINE TUNING
FOCUS COIL
FOCUS CONTROL
BRIGHTNESS CONTROL
CONTRAST CONTROL
VERT. HOLD CONTROL
VERT. LINEARITY CONTROL
HEIGHT CONTROL
HORIZ. HOLD CONTROL
HORIZ. LOCK-IN
HORIZ. FREQ.
HORIZ. WAVE FORM
HORIZ. DRIVE CONTROL
HORIZ. LINEARITY
WIDTH
DEFLECTION YOKE
ION TRAP
DO NOT MEASURE
SW ON VOLUME CONTROL
LOW CHANNELS
HIGH CHANNELS

HALLICRAFTERS MODELS 1000 (Ch. W1000D), 1008 (Ch. X1000D), 1019 (Ch. Z1000D)

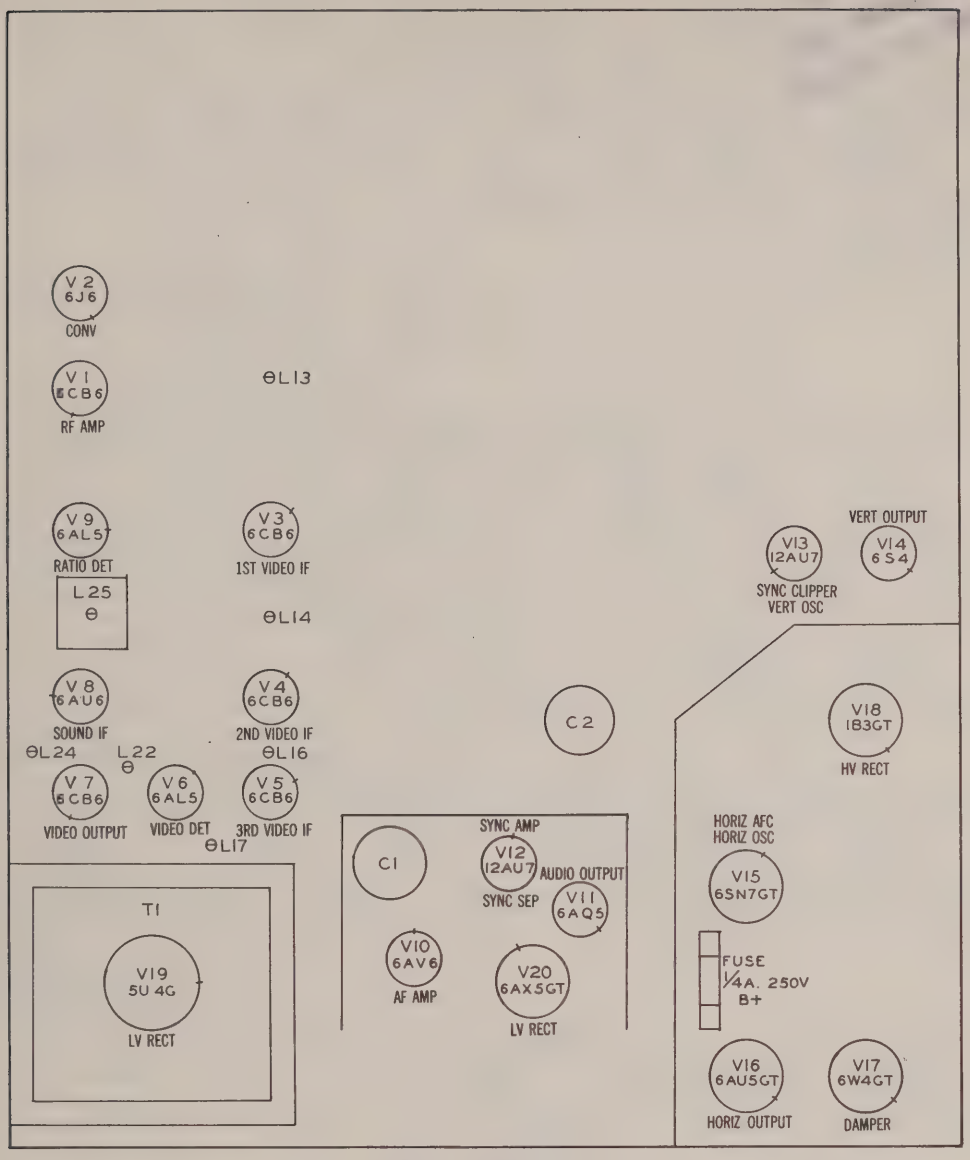
HALLICRAFTERS MODELS 1000 (Ch. W1000D) 1008 (Ch. X1000D), 1019 (Ch. Z1000D)

CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

TUBE PLACEMENT CHART



TOP VIEW

TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY
No raster, no sound-V19, V20 Fuse (M1)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster-V2, V3, V4, V5, V6, V7, V20
No pic, no sound, has snow- V1, V2, V3
No pic, has sound, has raster-V7, V21
Has pic, no sound-V8, V9, V10, V11
Overloaded picture-V6

SYNC FAILURE
No vert. sync.-V13
No horiz. sync.-V13, V15
No vert. or horiz. sync.-V12, V13

SWEEP FAILURE
No raster, has sound-V15, V16, V17, V18, V21
No vertical deflection-V14
Poor vert. linearity or foldover-V13, V14
Poor horiz. linearity or foldover-V15, V16, V17
Narrow picture-V15, V16, V17, V18, V19
Vert. off freq. -V13
Horiz. off freq. -V13, V15

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard can be eliminated by removing the horizontal oscillator tube, V15, from its socket.

VIDEO IF ALIGNMENT

Remove the converter tube, V2, from its socket and replace with a 6J6 which has pin 1 removed.
This will disable the local oscillator and reduce the possibility of erroneous indications.
Some of the IF cores are concealed by wax, which must be removed before the core adjustments can be made.
L13, the 1st. IF transformer is overcoupled and during adjustment it is necessary to shunt the primary with 1000Ω while adjusting A2. Then shunt the 1000Ω resistor across the secondary while adjusting A1.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube (V2). Low side to chassis.	24.75MC (Unmod.)	Any	DC probe to point ◇A◇. Common to chassis.	A1, A2	Adjust for maximum deflection. See Note above.
2.	"	"	25.6MC	"	"	A3	Adjust for maximum deflection. Attenuate generator output to maintain 2 volts at VTVM.
3.	"	"	23.1MC	"	"	A4	"
4.	"	"	24.5MC	"	"	A5	"
5.	"	"	21.75MC	"	"	A6	Adjust for MINIMUM deflection.

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6	Direct	High side to an ungrounded tube shield floating over dummy converter tube, V2. Low side to chassis.	24MC (10MC Swp)	21.75MC 26.25MC	Any	Vert. amp. to point ◇A◇. Low side to chassis.		Check for response curve similar to fig. 1. If necessary adjust A1 thru A5 for desired response.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
7.	.005MFD	High side to point ◇A◇. Low side to chassis.	4.5MC (Unmod.)	Any	DC probe to point ◇B◇. Common to chassis.	A7, A8	Adjust for maximum deflection. Attenuate generator to maintain 1 volt at VTVM.
8.	"	"	"	"	DC probe to point ◇C◇ Common to chassis.	A9	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	.005MFD	High side to point ◇A◇. Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. amp. to point ◇B◇. Low side to chassis.	A7, A8	Disconnect stabilizer capacitor C7. Adjust for curve of maximum amplitude and symmetry as per fig. 2.
8.	"	"	"	"	"	Vert. amp. to point ◇C◇. Low side to chassis.	A9	Reconnect capacitor C7. Adjust so that 4.5MC occurs at center of crossover lines as per fig. 3. SLIGHTLY retouch A8 for maximum amplitude and straightness of crossover lines.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
9.	.005MFD	High side to point ◇A◇. Low side to chassis.	4.5MC (Unmod.)	Any	DC probe thru crystal diode detector fig. 4 to pin 11 of picture tube. Common to chassis.	A10	Adjust for MINIMUM deflection.

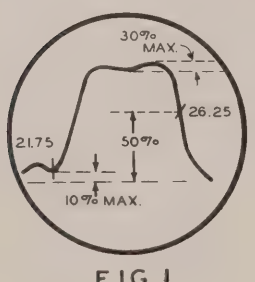


FIG.1

FIG.2

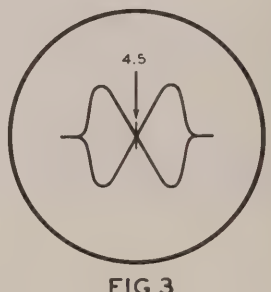


FIG.3

ALIGNMENT INSTRUCTIONS (CONT.)

OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket.
Connect the negative lead of a 1.5 volt battery to terminal #1 of the terminal strip on the tuner . Connect the positive lead to chassis.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator` output should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10.	Two 120 Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. amp. to point ⟨A⟩. Low side to chassis.	A11	Adjust to place sound marker in "notch" as shown in fig. 5.
11.	"	"	207MC (10MC Swp)	205.25MC 209.75MC	12	"	A12	Adjust to place sound marker in notch as per fig. 5. If any channel strip adjustment shows insufficient range readjust A11 and repeat all channel strip adjustments.
			201MC (10MC Swp)	199.25MC 203.75MC	11		A13	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A14	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A15	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A16	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A17	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A18	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A19	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A20	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A21	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A22	

THE RF AND MIXER PORTIONS OF THIS TUNER HAVE BEEN PROPERLY ALIGNED AT THE FACTORY AND ARE VERY STABLE. ALIGNMENT OF THESE PORTIONS SHOULD NOT BE REQUIRED IN THE FIELD.

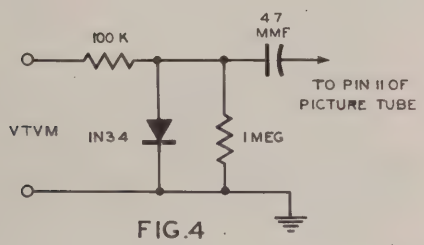


FIG.4

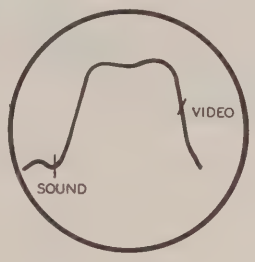
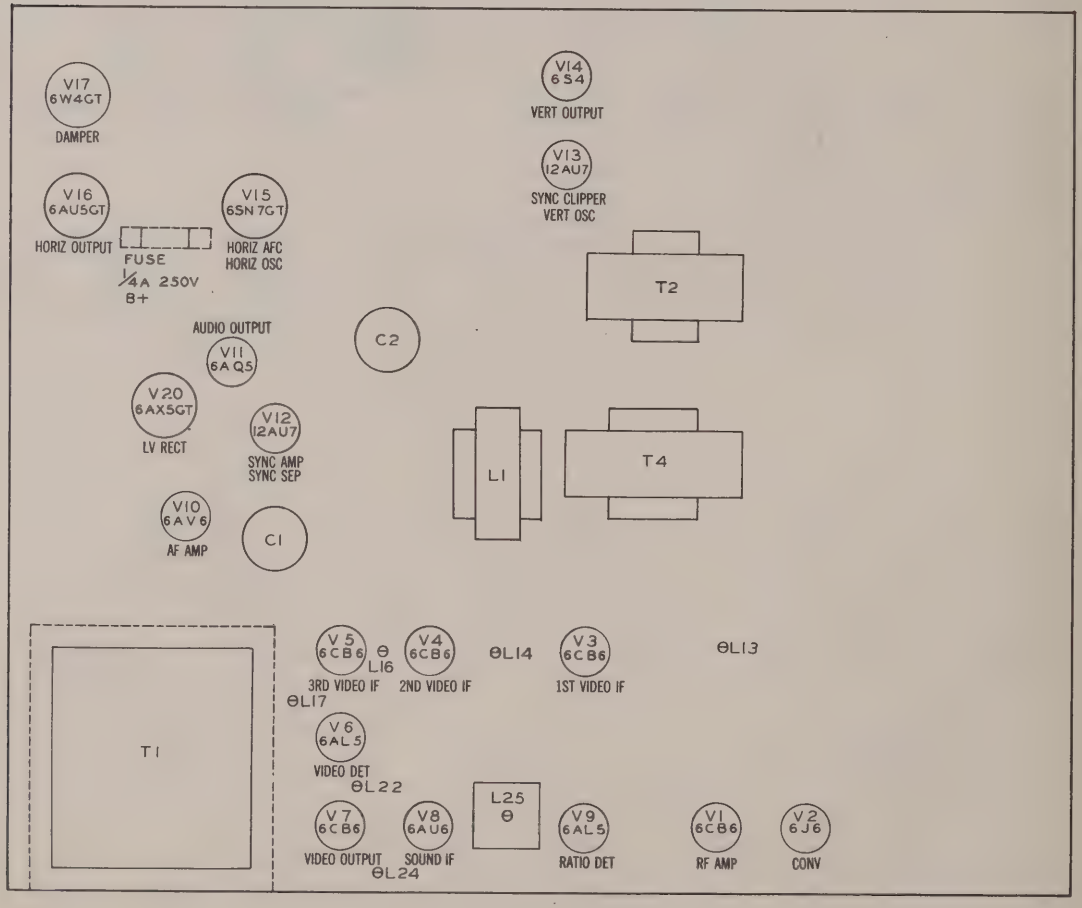


FIG.5

RESISTANCE MEASUREMENTS

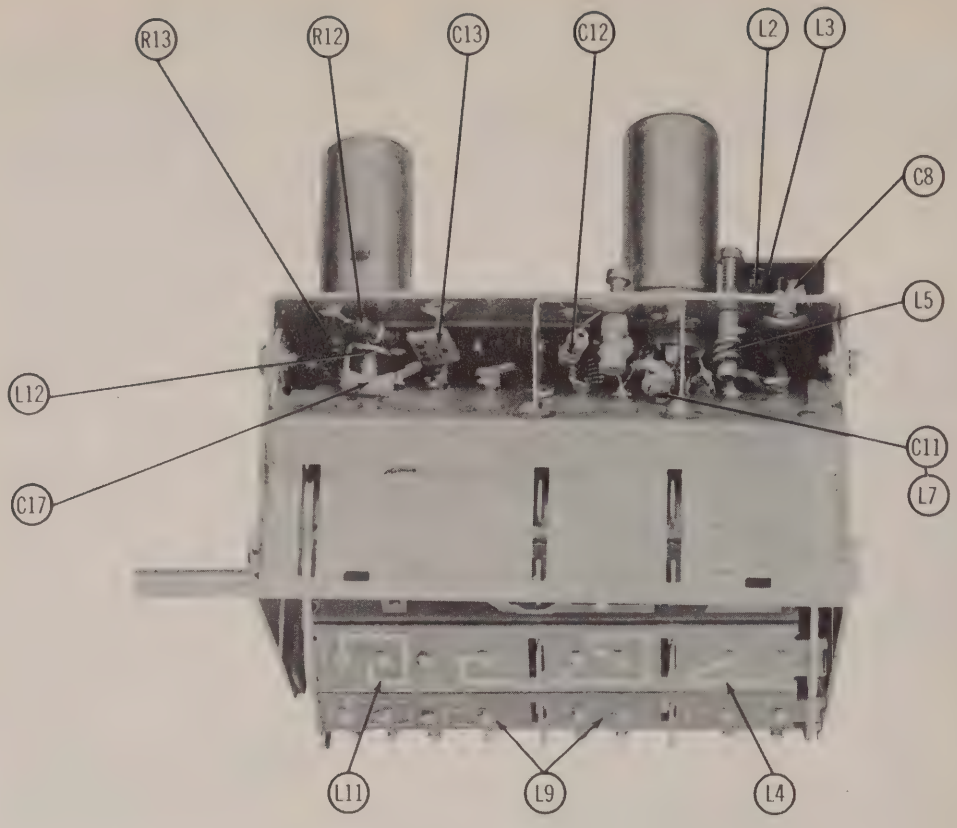
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6CB6	1Meg	0Ω	0Ω	.1Ω	■2KΩ	■7.8KΩ	0Ω		
V 2	6J6	■6.7KΩ	■12KΩ	.1Ω	0Ω	155KΩ	10KΩ	0Ω		
V 3	6CB6	1Meg	47Ω	0Ω	.1Ω	■950Ω	■950Ω	0Ω		
V 4	6CB6	1Meg	47Ω	0Ω	.1Ω	■850Ω	■850Ω	0Ω		
V 5	6CB6	.2Ω	150Ω	0Ω	.1Ω	■850Ω	■850Ω	0Ω		
V 6	6AL5	0Ω	3.3KΩ	.1Ω	0Ω	.2Ω	0Ω	0Ω		
V 7	6CB6	220KΩ	500Ω	.1Ω	0Ω	†8.2KΩ	■750Ω	500Ω		
V 8	6AU6	1Ω	0Ω	0Ω	.1Ω	■22KΩ	■22KΩ	150Ω		
V 9	6AL5	10KΩ	10KΩ	.1Ω	0Ω	1Meg	0Ω	INF		
V 10	6AV6	10Meg	0Ω	0Ω	.1Ω	0Ω	0Ω	†500KΩ		
V 11	6AQ5	500KΩ	270Ω	0Ω	.1Ω	†1.4KΩ	†1.1KΩ	500KΩ		
V 12	12AU7	■47KΩ	2.2Meg	0Ω	.1Ω	.1Ω	51KΩ	0Ω	270KΩ	0Ω
V 13	12AU7	■5.1KΩ	51KΩ	4.7KΩ	.1Ω	.1Ω	#2.7Meg	1.4Meg	0Ω	0Ω
V 14	6S4	INF	2.7KΩ	1 Meg	0Ω	.1Ω	1Meg	INF	INF	#3.9KΩ
V 15	6SN7GT	1.5Meg	†60KΩ	412KΩ	480KΩ	†55KΩ	0Ω	.1Ω	0Ω	
V 16	6AU5GT	470KΩ	0Ω	220Ω	INF	#19Ω	INF	.1Ω	†15KΩ	
V 17	6W4GT	INF	INF	340KΩ	INF	†270Ω	INF	#27Ω	#27Ω	
V 18	1B3GT	PINS 1 - 8 HAVE INF RESISTANCE								TopCap #167Ω
V 19	5U4G	INF	12KΩ	INF	23Ω	INF	25Ω	INF	12KΩ	
V 20	6AX5GT	#33Ω	0Ω	15Ω	INF	15Ω	#33Ω	.1Ω	40KΩ	
V 21	20CP4	0Ω	■29KΩ	Pin 10 #2.2KΩ	Pin 11 ■100KΩ	Pin 12 .1Ω				

ALL CONTROLS SET FOR NORMAL OPERATION, NO SIGNAL APPLIED
HI-LO LINE SWITCH IN HI LINE POSTIION
† MEASURED FROM PIN 8 OF V19
■ MEASURED FROM PIN 8 OF V20
MEASURED FROM PIN 3 OF V17

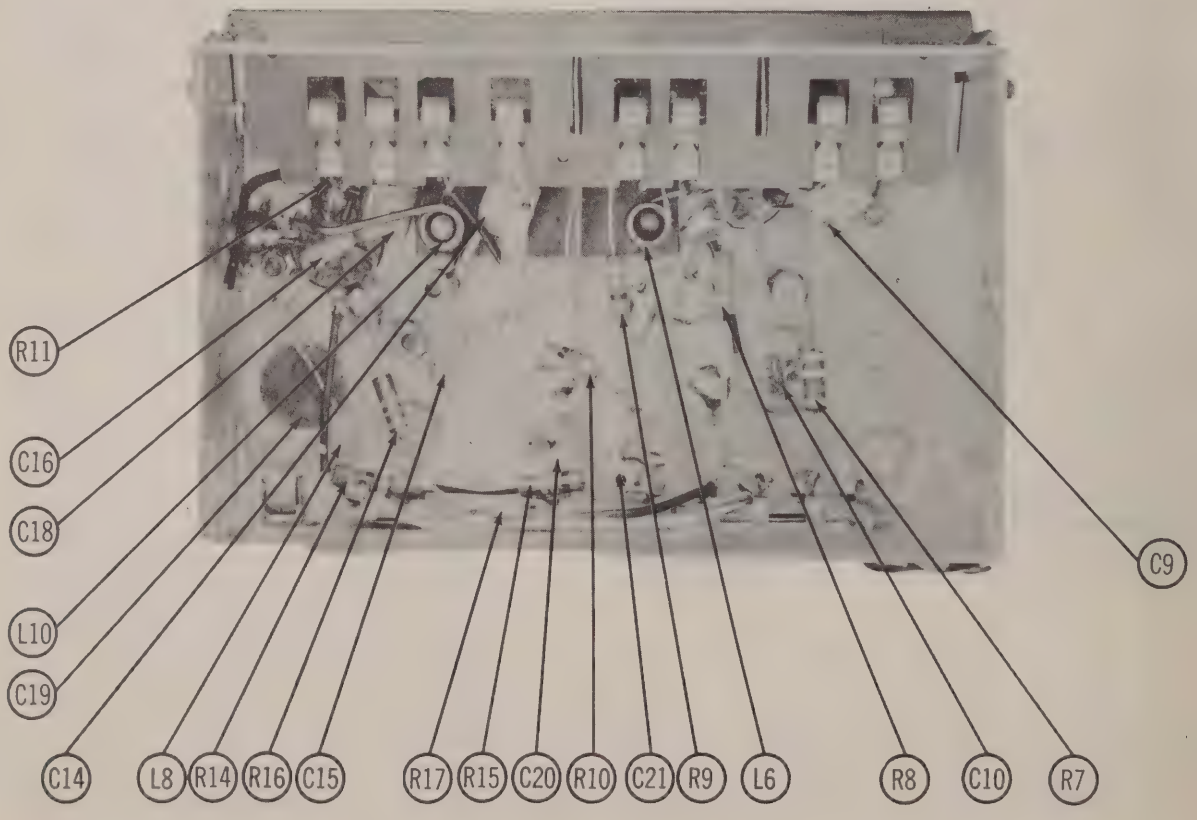


BOTTOM VIEW

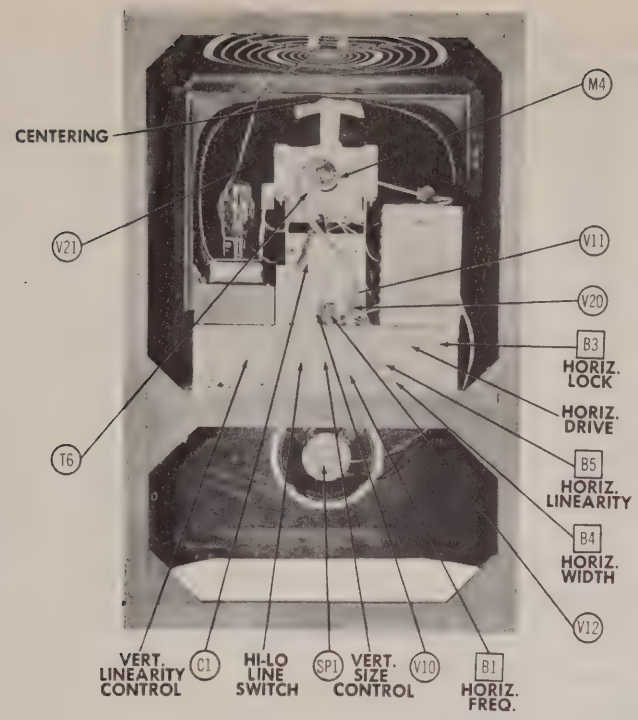
TUBE PLACEMENT CHART



RF TUNER-RIGHT SIDE



RF TUNER-BOTTOM VIEW



CABINET-REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Adjust the horizontal drive control clockwise until a vertical white line appears in the picture, then counter clockwise just for enough to remove the white line.

Turn the horizontal hold control fully clockwise.

Adjust the horizontal frequency slug (B1) until a vertical black bar appears in the picture.

Turn the horizontal hold control fully counter clockwise.

Momentarily, interrupt the signal by turning to another channel and back.

If more than three or four bars appear in picture turn the horizontal lock trimmer (B3) in a clockwise direction. If less than three or four bars appear turn B3 counter clockwise.

If the above procedure fails to yield satisfactory horizontal sync make the proper horizontal waveform adjustment.

Connect the vertical input of an oscilloscope through 47KΩ to terminal C of L26.

Observe the waveform on the scope and adjust the waveform slug (B2) for the proper waveform as in fig. 6 with the broad and narrow peaks of equal height. If necessary keep the picture synchronized by adjusting B1.

Adjust the width slug (B4) for a picture slightly wider than enough to fill the picture mask.

Adjust the horizontal linearity slug (B5) for a picture that is symmetrical from left to right.

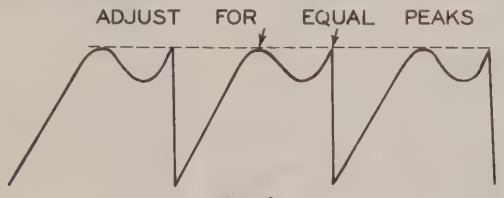


FIG. 6

DISASSEMBLY INSTRUCTIONS

1. Remove 8 push on type control knobs from front panel.
2. Remove 7 wood screws and 1 metal screw. Remove rear cover.
3. Disconnect built-in antenna and speaker.
4. Remove 4 speaker nuts. Remove speaker.
5. Remove 5 chassis bolts. Remove chassis.

NOTE: FOR PICTURE TUBE REMOVAL IT IS NECESSARY TO REMOVE CHASSIS AS OUTLINED ABOVE.

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: Hallicrafters PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V1	RF Amplifier	90X6CB6	6CB6	7CM	
V2	Converter		6J6	7BF	
V3	1st. Video IF Amp.	90X6CB6	6CB6	7CM	
V4	2nd. Video IF Amp.	90X6CB6	6CB6	7CM	
V5	3rd. Video IF Amp.	90X6CB6	6CB6	7CM	
V6	Video Detector	90X6AL5	6AL5	6BT	
V7	Video Output	90X6CB6	6CB6	7CM	
V8	Sound IF Amp.	90X6AU6	6AU6	7BK	
V9	Ratio Detector	90X6AL5	6AL5	6BT	
V10A	AF Amplifier	90X6AV6	6AV6	7BT	
B	AF Amplifier	90X6SQ7	6SQ7	8Q	
V11	Audio Output	90X6AQ5	6AQ5	7BZ	
V12A	Sync Amplifier - Sync Separator	90X12AU7	12AU7	9A	
B	Sync Amplifier - Sync Separator	90X6SN7GT	6SN7GT	8BD	
V13A	Sync Clipper - Vert. Oscillator	90X12AU7	12AU7	9A	
B	Sync Clipper - Vert. Oscillator	90X6SN7GT	6SN7GT	8BD	
V14	Vert. Output	[illegible]X84	6S4		
V15	Horiz. AFC - Horiz. Oscillator	90X6SN7GT	6SN7GT	8BD	
V16A	Horiz. Output	90X6AU5G T	6AU5GT	6CK	
B	Horiz. Output	90X6AV5GT	6AV5GT	6CK	
V17	Damper	90X6W4GT	6W4GT	4CG	
V18	HV Rectifier	90X1B3GT	1B3GT	3C	
V19	LV Rectifier	90X5U4G	5U4G	5T	
V20	LV Rectifier	90X5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: Hallicrafters PART No.	REPLACEMENT DATA: SYLVANIA PART No.	RTMA BASE TYPE	NOTES
V21A	90X20CP4	20CP4	12D	① Circuit changes necessary.
		20CP4A ①	12D	② 3/8" longer
		20DP4	12D	
		20DP4A ① ②	12D	
		20HP4 ① ②	12D	
		20HP4A ① ②	12C	
		20LP4 ① ②	12C	
B	90X17BP4A	17BP4	12D	
C	90X14EP4	14CP4	12D	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: Hallicrafters PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	▲60	450	45B173	AFH3-207		UPT52245		FP368	TVL-2770	
B	▲40	450				BRH501			TVA-1310	
C	▲75	50								
C2A	▲40	250	45B174	AFH4-130		UP4445C		FP413X	TVL-4739	
B	▲40	250				BR4025				
C	▲40	450								
D	20	25								
C3	10	450	45B200	PRS450/10		BR1045A		TC72	TVA-1705	Note 1
C4	5	50	45B175	PRS150/4		BR550		TC30	TVA-1303	
C5A	10	450	45A173	PRS450/10-10		BRD145B		TCD72	TVA-2722	
B	10	450								
C6	100	10	45B170	PRS12/100		BRH12IA		TC2501	TVA-1130	
C7	5	50	45B175	PRS150/4		BR550		TC30	TVA-1303	
C8	300			SI300	D6-301		GP2K-301	UC-533	5GA-T3	Note 2
C9	27									
C10A	1500			BPD-0015	DD-152	TM5D15	801-0015	DC-5215	5HK-D15	
B	1500			BPD-0015	DD-152	T45D15	801-0015	DC-5215	5HK-D15	
C	1500			BPD-0015	DD-152	TM5D15	801-0015	DC-5215	5HK-D15	
C11	1500			BPD-0015	DD-152	TM5D15	801-0015	DC-5215	5HK-D15	
C12	18				TCN-18		N750K-180			
C13	16									
C14	100			SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C15	2.2				TCZ-2.2		NP0K-2R2		5TCCB-V22	
C16	20				TCN-20		N750K-200		5TCU-Q2	Note 3
C17	3.3			SI3.3NP0	TCZ-3.3		NP0K-3R3		5TCCB-V33	
C18	39				TCZ-39		NP0L-390		5TCC-Q39	
C19A	1500			BPD-2X0015	DD-2-152	TM5DD15	812-0015	DCD-5215	5HK-2D15	
B	1500									
C20	10			SI10NP0	TCZ-10		NP0K-100	ZT-541	5TCC-Q1	
C21	1500			SI1500	D6-152	TM5D15	801-0015	UC-5215	5HK-D15	
C22	5000		47A168	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK- D5	
C23	5000		47A168	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C24	5000		47A168	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C25	5000		47A168	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C26	5000		47A168	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C27	68				TCZ-68		NP0-333-680			
C28	5000		47A168	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C29	5000		47A168	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C30	5000		47A168	BPD-005	DD-502	TM5D6	811-005	DC-525	5HK-D5	
C31	10		47B20100K5	SI10	D6-100		GP1K-100	UC-541	5GA-Q1	
C32	5		47B20050K5	SI5	TCZ-4.7		GP1K-050	ZT-555	5GA-V5	
C33	.5	25	46A177	P288-5		PJ2P5		PT405	2TM-P5	
C34	.5	300	46A177	P288-5		PJ2P5		PT405	2TM-P5	
C35	47			SI47N750	TCN-47		N750K-470	NT-5447	5TCU-Q47	
C36	.1	200	46AU104J	P288-1	DF-104	PJ3P1		PT401	2TM-P1	
C37	2.2		46A160-4		TCZ-2.2		NP0K-2R2		5TCCB-V22	
C38	47			SI47N750	TCN-47		N750K-470	NT-5447	5TCU-Q47	
C39A	4000		47A218	BPD-2X004	D6-402	TM5DD4	822-004	DCD-524	5HK 2D4	
B	4000				D6-402					
C49	330		47B20331K5	SI330	D6-331		GP2K-331	UC-5333	5GA-T33	

CAPACITORS (CONT.)

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: Hallicrafters PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C41	1000	500	47B20A102M5	1468-001	D6-102		WD5D1	GP2L-102	MC255	1FM-21
C42	.01	600	46AY103J	P688-01	D6-103		PTE6S1	GP2-333-103	PT611	6TM-S1
C43A	.01									
B	250		†49A017						†102C1	
C										
C44	.01	600	46AY103J	P688-01	D6-103		PTE6S1	GP2-333-103	PT611	6TM-S1
C45	220	500	47X20B221K	1469-00025	D6-221		5R5T25	GP2K-221	MCB240	
C46	.05	600	46AY503J	P688-05	DF-503		PTE6S5		PT615	6TM-S5
C47	.05	600	46AY503J	P688-05	DF-503		PTE6S5		PT615	6TM-S5
C48	68		47B20680K5	SI68	D6-680		5W5Q7	GP1K-680	UC-5468	5GA-Q68
C49	.5	200	46AT504J	P288-5			PJ2P5		PT405	2TM-P5
C50A	.002			P888-002			PTE6D2		PT622	
B	.005		•49A015	P688-005	•PC-100		PTE6D5	•1405-01	PT625	•101C1
C	.005			P688-005			PTE6D5		PT625	
C51	6800	500	47X35B682K						MCB469	MS-27
C52	5000		47A168	BPD-005	DD-502	TM5D5		811-005	DC-525	5HK-D5
C53	1000		47B20A102M5	SI1000	D6-102	T45D1		GP2L-102	UC-521	5HK-D1
C54	.05	600	46AY503J	P688-05	DF-503		PTE6S5		PT615	6TM-S5
C55	.05	200	46AU503J	P288-05	DF-503		PJ2S5		PT415	2TM-S5
C56	.1	600	46AX104J	P688-1	DF-104		PTE6P1		PT601	6TM-P1
C57	.01	600	46AY103J	P688-01	D6-103		PTE6S1	GP2-333-103	PT611	6TM-S1
C58	.01	600	46AY103J	P688-01	D6-103		PTE6S1	GP2-333-103	PT611	6TM-S1
C59	120	500	47X20B121K	1469-00015			5R5T15		MCB236	
C60	330	500	47X20B331K	1469-00035						
C61	82	500	47X20B820K							
C62	82	500	47X20B820K							
C63	.05	600	46AY503J	P688-05	DF-503		PTE6S3		PT615	6TM-S5
C64	.5	200	46AT504J	P288-5			PJ2P5		PT405	2TM-P5
C65	.02	400	46AY203J	P488-02	DF-203		PTE4S2		PT412	4TM-S2
C66	.05	600	46AY503J	P688-05	DF-503		PTE6S5		PT615	6TM-S5
C67	330	500	47X20B331K	1469-00035						
C68	.01	400	46BR103E4	P488-01	D6-103		PTE4S1	GP2-333-103	PT411	4TM-S1
C69	820	500	47X25B821K							
C70	4700	500	47X35B472K	1464-005			IDR5D5		MCB465	MS-25
C71	.05	600	46AY503J	P688-05	DF-503		PTE6S5		PT615	6TM-S5
C72	.1	600	46AX104J	P688-1			PTE6P1		PT601	6TM-P1
C73	.03	600	46AY303J	P688-03			PTE6S3		PT613	6TM-S3
C74	.1	600	46AX104J	P688-1	DF-104		PTE6P1		PT601	6TM-P1
C75	.03	600	46AY303J	P688-03			PTE6S3		PT613	6TM-S3
C76	500	20000	47A223	HV20A	TV1-502	MMA-20TS	413-501	HV20035	20DK-T5	
C77	.01	600	46BR103J6	689ZGXY-01		PJ6S1		PT611	6TM-S1	
C78	.01	600	46BR103J6	689ZGXY-01		PJ6S1		PT611	6TM-S1	

Note 1. Some Models use 8MFD in this application (Part #45A103)
Note 2. Some Models use 270MMF in this application
Note 3. Some Models use 15MMF in this application
• Items C50A, C50B, C50C, R60A, R60B, R60C are combined in one unit.
† Items C43A, C43B, C43C, R48A, R48B are combined in one unit.
When replacing items separately, C43B and C43C should total 250MMF

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: Hallicrafters PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	50KΩ	½	25A858	Q11-123	AG-44-S	AB-31	SU-35	Horiz. Drive
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R1A
R2A	5000Ω	½	25B712	Q11-114	AG-19-S	AB-10	SU-14	Vert Linearity
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R2A
R3A	2.5Meg	½	25B711	Q11-239	AG-84-S	AB-83	SU-565	Height
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R3A
R4A	1Meg	½	25B817	QJ-304 *	RTV-40	SBB0688	UF16L	Vert Hold-Panel
B	50KΩ						UR54L	Horiz. Hold-Rear
R5A	2500Ω	2	25B895	QJ-306 **	RTV-235		WF252L	Focus- Wire Wound -Panel
B	50KΩ						UR54L	Brightness-Rear
R6A	2500Ω	½	25B888	CJ-22 †	RTV-237	SBB-705-S	UP252L	Contrast-Panel
B	1Meg						UR16A	Volume-Rear
C	Switch						US-26	Attach to R6B

* CONCENTRIKIT EQUIVALENT-KIT K-2, BASE ELEMENTS & SHAFTS B11-137 & P10106 (Panel) B11-123 & R2-127 (Rear)

** CONCENTRIKIT EQUIVALENT-KIT K-3, BASE ELEMENTS & SHAFTS W11-111 & P3-106 (Panel) B11-123 & R2-121 (Rear)

† CONCENTRIKIT EQUIVALENT-KIT K-2, BASE ELEMENTS & SHAFTS B17-111 & P1-126 (Panel) B13-137 & R2-216 (Rear) & SWITCH 76-1.

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: Hallicrafters PART No.	IRC PART No.	NOTES
R7	3900Ω	½		BTS-3900	
R8	6800Ω	½		BTS-6800	
R9	1000Ω	½		BTS-1000	
R10	1000Ω	½		BTS-1000	
R11	4700Ω	½		BTS-4700	
R12	150KΩ	½			
R13	10KΩ	½			
R14	22KΩ	½			
R15	10KΩ	½			
R16	4700Ω	½		BTS-4700	Note 1
R17	1000Ω	½		BTS-1000	
R18	4700Ω	½	23X20X472K	BTS-4700	
R19	4MΩ	½	23X20X470K		
R20	100Ω	½	23X20X101K	BTS-100	
R21	270Ω	½	23X20X271K	BTS-270	Note 2
R22	270Ω	½	23X20X271K	BTS-270	Note 2
R23	12KΩ	½	23X20X123K		
R24	47Ω	½	23X20X470K		
R25	100Ω	½	23X20X101K	BTS-100	
R26	100Ω	½	23X20X101K	BTS-100	
R27	10KΩ	½	26X20X103K	BTS-10K	
R28	150Ω	½	23X20X151K	BTS-150	
R29	100Ω	½	23X20X101K	BTS-100	
R30	1Meg	½	23X20X105M	BTS-1Meg	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: Hallicrafters PART No.	IRC PART No.	NOTES
R31	3300Ω	½	23X20X332K	BTS-3300	
R32	220KΩ	½	23X20X224K	BTS-220K	
R33	150Ω	½	23X20X151K	BTS-150	
R34	5600Ω	2	23X40X562K	BTS-5600	
R35	1500Ω	1	23X30X152K	BTA-1500	
R36	10KΩ	½	23X20X103K	BTS-10K	
R37	100KΩ	½	23X20X104 M	BTS-100K	
R38	10KΩ	½	23X20X103K	BTS-10K	
R39	6800Ω	½	23X20X682K	BTS-6800	Note 9
R40	47KΩ	½	23X20X473K	BTS-47K	
R41	150Ω	½	23X20X151K	BTS-150	
R42	22KΩ	½	23X20X223K	BTS-22K	
R43	270Ω	½	23X20X271K	BTS-270	
R44	33KΩ	½	23X20X333K	BTS-33K	
R45	10KΩ-5%	½	23X20X103J	BTS-10K-5%	
R46	10KΩ-5%	½	23X20X103J	BTS-10K-5%	
47	10Meg	½	23X20X105 M	BTS-10Meg	
R48A	500KΩ		†49A017		
B	500KΩ				
R49	270Ω	2	23X40X271K	BW-2-270	
R50	15KΩ	10	24A922	1 3/4A-15K	
R51	220KΩ	½	23X20X224M	BTS-220K	
R52	2.2Meg	½	23X20X225M	BTS-2.2Meg	
R53	47KΩ	½	23X20X473M	BTS-47K	

RESISTORS (CONT.)

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: Hallicrafters PART No.	IRC PART No.	NOTES
R54	270KΩ-5%	½	23X20X274M	BTS-270K-5%	
R55	820KΩ	½	23X20X824M	BTS-820K	
R56	47KΩ	½	23X20X473M	BTS-47K	
R57	4700Ω	1	23X30X472K	BTA-4700	
R58	2200Ω	1	23X30X222K	BTA-2200	
R59	2200Ω	½	23X20X222K	BTS-2200	
R60A	22KΩ	½	•49A015	BTS-22K	
B	8200Ω	½		BTS-8200	
C	8200Ω	½		BTS-8200	
R61	1.2Meg	½	23X20X125K	BTS-1.2Meg	Note 3
R62	1Meg	1	23X30BF105M	BTA-1Meg	
R63	12KΩ	½	23X20X123K	BTS-12K	Note 4
R64	1Meg	½	23X20X105M	BTS-1Meg	
R65	1000Ω	1	23X30X102K	BTA-1000	
R66	4700Ω	½	23X20X472K	BTS-4700	
R67	680Ω	½	23X20X681M	BTS-680	
R68	330KΩ	½	23X20X334K	BTS-330K	
R69	820KΩ	½	23X20X824K	BTS-820K	
R70	82KΩ	1	23X30X823K	BTA-82K	
R71	330KΩ	1	23X30BF334J	BTA-330K	
R72	3900Ω	½	23X20X392K	BTS-3900	

Note 1. Some models use a 1000Ω resistor in this application.
Note 2. Some models use a 150Ω resistor in this application.
Note 3. Some models use a 820KΩ resistor in this application.
Note 4. Some models use a 8200Ω resistor in this application.
Note 5. Some models use a 47Ω resistor in this application.
Note 6. Some models use a 1Meg resistor in this application.
Note 7. Use only with English make (Varley) power transformer.
Note 8. Not used in all models.
† Items R48A, R48B, C43A, C43B, C43C are combined in one unit.
• Items R60A, R60B, R60C, C50A, C50B, C50C are combined in one unit
Note 9. Not used in Model #1019
Note 10. Model #1019 uses a 12KΩ resistor in this application.

ITEM No.	RATINGS	REPLACEMENT DATA: Hallicrafters PART No.	IRC PART No.	NOTES
R73	120KΩ 1	23X20BF124K	BTA-120K	
R74	68KΩ ½	23X20X683K	BTS-68K	
R75	150KΩ ½	23X20X154K	BTS-150K	
R76	8200Ω 1	23X20X822K	BTS-8200	
R77	47KΩ 1	23X30BF473K	BTA-47K	
R78	330KΩ ½	23X20X334K	BTS-330K	
R79	12KΩ ½	23X20X123K	BTS-12K	Note 9
R80	470KΩ ½	23X20X474M	BTS-470K	
R81	68Ω ½	23X20X680K		Note 5
R82	470KΩ ½	23X20X474K	BTS-470K	
R83	220Ω 3	24A925		
R84	15KΩ 2	23X40X153K	BTB-15K	Note 10
R85	200Ω 5	24A926	1 3/4A-200	Note 9
R86	2200Ω 1	23X30X222K	BTA-2200	
R87	3.3Ω ½	23X20X033K		
R88	680KΩ 1	23X30X684K		Note 6
R89	1000Ω 5	24A921	1 3/4A-1000	
R90	20Ω 7.5	24A947		Note 7
R91	750Ω 10	24A920	1 3/4A-750	
R92	150KΩ ½	23X20X154K	BTS-150K	
R93	270KΩ ½	23X20X274K	BTS-270K	Note 8

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: Hallicrafters PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
T1	117VAC ④ 1.75A	620VCT .190ADC Tap ④	5VAC ④ 3A	6.3VAC ④ 8.7A SEC. 4	52C204		P-3073		
		400VCT .080ADC		6.3VAC ④ 1.2A					

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING: DC RESISTANCE PRI.	RATING: DC RESISTANCE SEC.	REPLACEMENT DATA: Hallicrafters PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	NOTES
T2	170Ω	900Ω	55-115	A-8111	A-3000	TBO-1	A-97X ②	Vert. Osc. Trans.
T3	162Ω tap ④ 14Ω	33.5Ω tap ④ 80.2Ω SEC. 2 0Ω	55C152 ⑥ 55C149 ①	A-8130	HVO-7	TBF-5		Horiz. Output Trans.
T4	1700Ω tap ④ 5Ω		55C189 55B151 ⑥	A-8141	A-3039		A-104-X ②	Vert. Output Trans.
T5A	20Ω		53C237	DY-9	MDF-70	TY-3	Y-17	Horiz. Deflection Coils
B	47Ω		53C197 ④					Vert. Deflection Coils
T6	1000Ω		51A1287 51B1246 ⑤					EM-PM Focus Coil

① Alternate vert. osc. trans.
② Drill one new mtg. hole
③ Alternate vert. output trans.
④ Alternate deflection yoke.
⑤ Alternate focus coil
⑥ Used in Model 1019

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: Hallicrafters PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	NOTES
T7	4.3KΩ	3.2Ω	280Ω .48Ω	55B150	A-3877 ①	A-2930 ③	RO-8 ①	S-3X ①	① Bend mtg. tab down. Mount on orig. bracket.

SPEAKER

ITEM No.	RATINGS: SIZE	RATINGS: FIELD	RATINGS: V. C. IMP.	REPLACEMENT DATA: Hallicrafters PART No.	JENSEN PART No.	QUAM PART No.	NOTES
SP1	8"	PM	3.2Ω	85C104	ST-115 Mod. P8-V	8A21	

FILTER CHOKE

ITEM No.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D.C. RESISTANCE	RATINGS: INDUCTANCE (0 CURRENT 1000 ~)	REPLACEMENT DATA: Hallicrafters PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
L1	.175A	70Ω	1.5 Hv.	56B117 56C116 ①	C-2327 ②	C-2994 ②	TR-3300 ②	C-21X ②

① Alternate choke
② Drill one new mtg. hole.

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA		NOTES
		PRI.	SEC.	Hallicrafters PART No.	MERIT PART No.	
L2	Ant. Trans.	.1Ω	.1Ω			
L3	Ant. Coupling	.4Ω				Wound on 12MMF capacitor
L4	Ant. Coils	0Ω				
L5	Ant. Coil	0Ω				Channel 2
L6	RF Coil	0Ω				Channel 2
L7	RF Choke	0Ω				
L8	Fil. Choke	0Ω				
L9	RF Mixer Grid Coils	0Ω				
L10	Mixer Grid	0Ω				Channel 2
L11	Osc. Coils	0Ω				
L12	Osc. Coil	0Ω				Channel 2
L13	1st. Video IF	.2Ω	.2Ω	51B1334		
L14	2nd. Video IF	.2Ω	.2Ω	50A475		
L15	Fil. Choke	0Ω		53A200		
L16	3rd. Video IF	.2Ω	.2Ω	51B1332 *		Includes Trap
L17	4th. Video IF	.2Ω	.2Ω	50A477		
L18	RF Choke	2.2Ω		53B008		
L19	Peaking Coil	9.5Ω		51A1256	TV-181 ♦	Wound on 6.8KΩ resistor
L20	Peaking Coil	12Ω		51A1260	TV-185 †	Wound on 2.2KΩ resistor
L21	Peaking Coil	.8Ω		51A1257	TV-185 ■	Wound on 15KΩ resistor
L22	4.5MC Trap	.9Ω		51B1333	TV-151	Alternate part #50B474
L23	Peaking Coil	17Ω		51A1259	TV-188 ▲	Wound on 2.2KΩ resistor
L24	Sound IF	1Ω		51B1333	TV-151	Alternate part #50B474
L25	Ratio Det.	4Ω	.8Ω CT	50C473	TV-110 ●	Tertiary .2Ω
L26	Horiz. Osc.	73Ω	45Ω	51B1242	TV-162	Tap @ 54Ω
L27	Width Coil	13Ω		51-1489		Alternate part #51B1330
L28	Horiz. Lin.	5.5Ω		51B1331		Alternate part #51B1340 tapped @ 1.5Ω

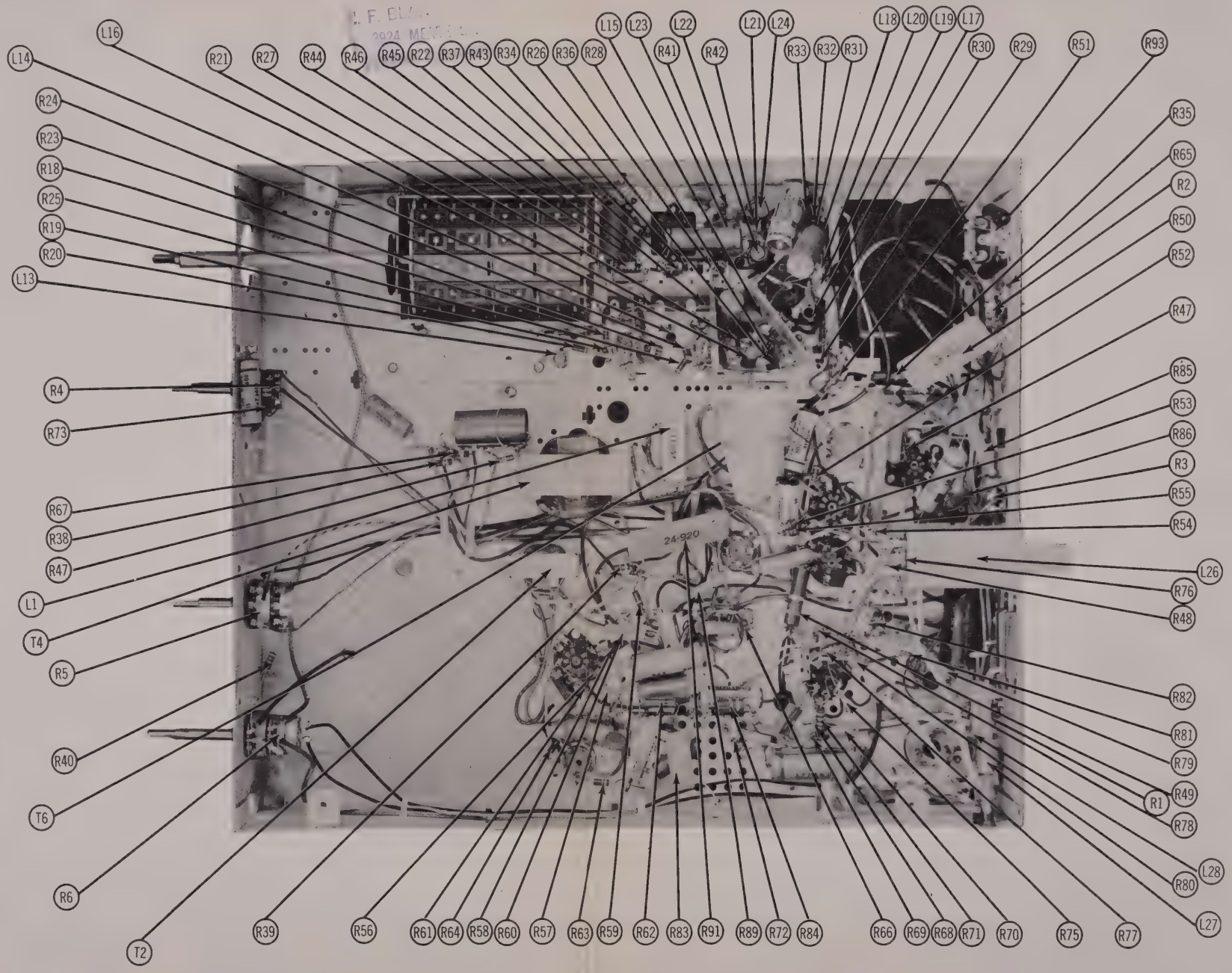
* Alternate part #50A476
♦ Parallel with 6.8KΩ resistor
† Parallel with 2.2KΩ resistor
■ Parallel with 15KΩ resistor
▲ Parallel with 2.2KΩ resistor
● Drill one new Mounting hole.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			Hallicrafters PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	1/4A 125V.	39A344		315.250		MDV 1/4 A	

MISCELLANEOUS

ITEM No.	PART NAME	Hallicrafters PART No.	NOTES
M2A	RF Tuner	1D961	
B	RF Tuner	1A1077	Alternate
C	RF Tuner	1A1088	Alternate
M3	Switch	60A249	Hi-Lo Line (Not used in Model 1019)
M4	Ion Trap	21A101	
	Knobs	15B234	Brightness & Vert. Hold
	Knobs	15D293	Channel Selector
	Knobs	15A299	Fine Tuning
	Knobs	15D265	Contrast
	Knobs	15B269	Focus & Horiz. Hold
	Knobs	15C297	Off/on Volume
	Safety Glass	22-352	Model 1008 only
	Gasket	16A273	Safety Glass Mounting Rubber (Model 1008 only)
	Back Cover	8-1676	Model 1008 only
	Mask	7-357	Model 1008 only
	Name Plate	13A984	
	Retainer Bracket	67B1838	Plastic, for safety glass (Model 1008 only)
B3	Trimmer	44A391	Horiz. Lock (7-100MMF) (Some models use fixed 68MMF capacitor in this application.

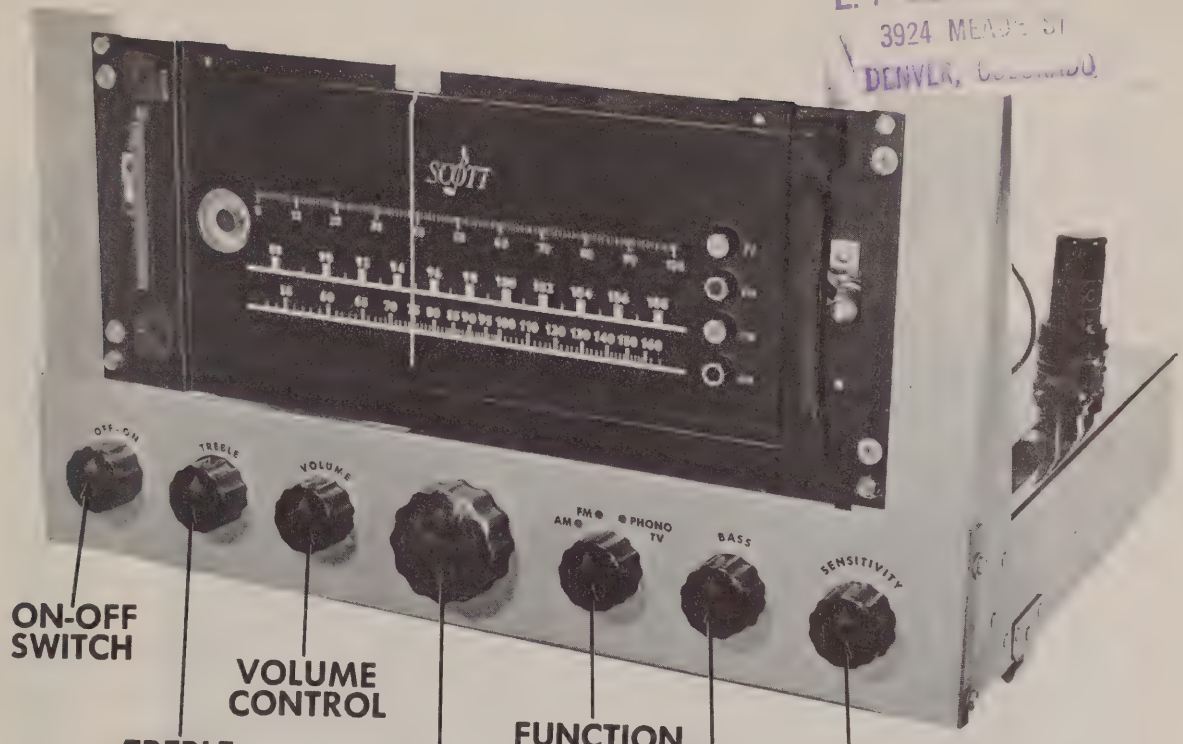


CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

SCOTT MODEL 1000

PRO...
L. F ...
3924 MEA... ST
DENVER, COLORADO

SCOTT MODEL 1000



SCOTT MODEL 1000

TRADE NAME	Scott Model 1000
MANUFACTURER	Scott Radio Laboratories, Inc., 4541 Ravenswood Ave., Chicago 40, Ill.
TYPE SET	AC Operated AM-FM Superheterodyne Receiver for Custom Installation
TUBES (SIXTEEN)	Types 6CB6 FM RF Amp., 12AT7 FM Conv., 6BA6 AM RF Amp., 6BE6 AM Conv., 6BA6 FM AM IF Amp., 6AU6 2nd FM IF Amp., 6AU6 3rd. FM IF Amp., 6AL5 Ratio Det., 6SQ7 AM Det.-1st. AF Amp., 6E5 Tuning Ind., 6SN7GT 2nd. AF Amp.-Cath. Fol., 6SN7GT Phase Inv., (2) 6L6G Audio Output, 5U4G Rect., 6SC7 Phono Pre Amp.
POWER SUPPLY	110-120 Volts AG-60 Cycle RATING 1.25 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	535-1620 KC FREQ. MOD. 87.5MC-108.5MC

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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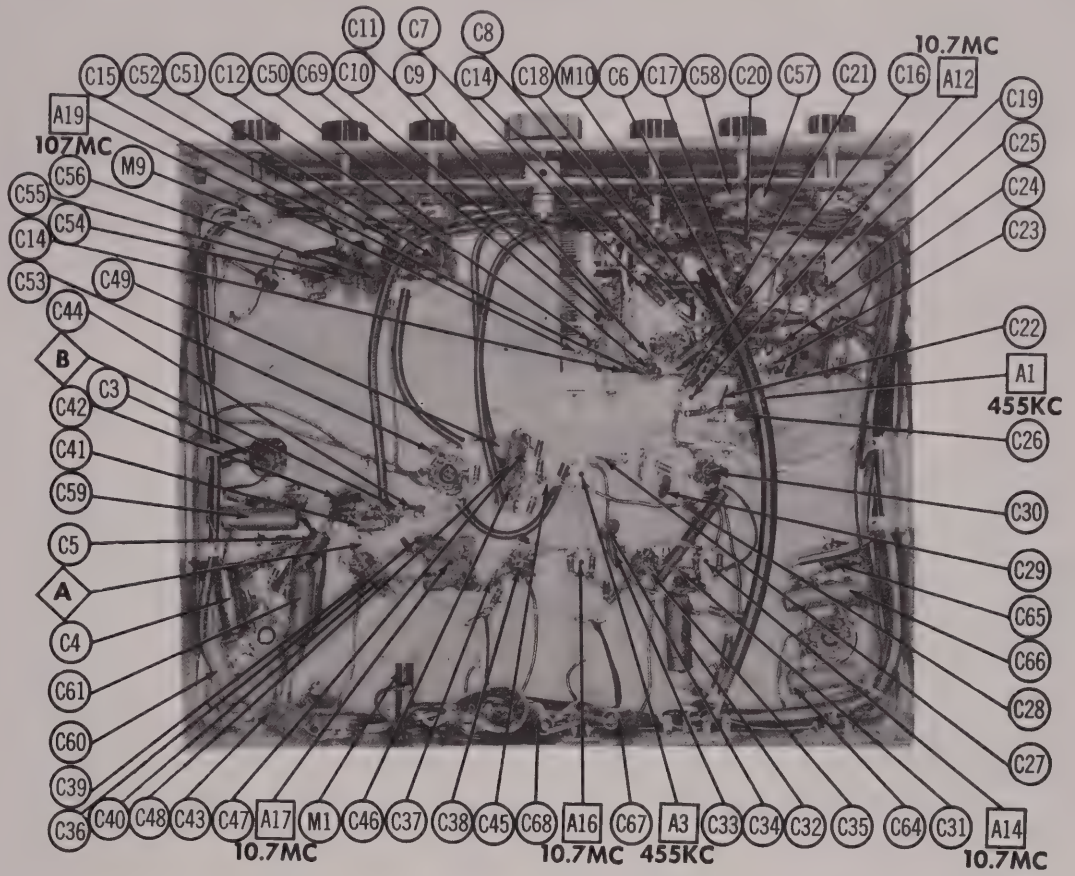

C11
C7
C8
10.7MC
C15
C52
C51
C12
C50
C69
C10
C9
C14
C18
M10
C6
C17
C58
C20
C57
C21
C16
A12
C19
A19
107MC
M9
C25
C56
C24
C55
C54
C23
C14
C53
C49
C22
C44
B
A1
C3
455KC
C42
C26
C41
C30
C59
C29
C5
C65
A
C66
C4
C28
C61
C27
C60
C39
C36
C40
C48
C43
C47
A17
M1
C46
C37
C38
C45
C68
A16
C67
A3
C33
C34
C32
C35
C64
C31
A14
10.7MC
10.7MC
455KC
10.7MC

SCOTT
MODEL 1000

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: SCOTT PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V1	FM RF Amplifier	6CB6	6CB6	7CM	
V2	FM Converter	12AT7	12AT7	9A	
V3	AM RF Amplifier	6BA6	6BA6	7BK	
V4	AM Converter	6BE6	6BE6	7CH	
V5	1st. FM AM IF Amp	6BA6	6BA6	7BK	
V6	2nd. FM IF Amp.	6AU6	6AU6	7BK	
V7	3rd. FM IF Amp.	6AU6	6AU6	7BK	
V8	Ratio Detector	6AL5	6AL5	6BT	
V9	AM Detector-1st. AF Amplifier	6SQ7	6SQ7	8Q	
V10	Tuning Indicator	6E5	6E5	6R	
V11	2nd. AF Amplifier Cathode Follower	6SN7GT	6SN7GT	8BD	
V12	Phase Inverter	6SN7GT	6SN7GT	8BD	
V13	Audio Output	6L6G	6L6G	7AC	
V14	Audio Output	6L6G	6L6G	7AC	
V15	Rectifier	5U4G	5U4G	5T	
V16	Phono Pre-Amp.	6SC7	6SC7	8S	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: SCOTT PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	▲20	450		AFH4-14		UPT2222-45		FP444	TVL-4763	
B	■20	450								
C	20	450								
D	▲20	450								
C2	25	50		PRS50/25		BR255A		TC36	TVA-1306	
C3A	▲20	450		AFH4-14		UPT2222-45		FP444	TVL-4763	
B	▲20	450								
C	■20	450								
D	20	450								
C4	25	25		PRS25/25		BR252A		TC26	TVA-1205	Note 1
C5	4	50		PRS150/4		BR550		TC30	TVA-1303	
C6	1500			SI1500	D6-152	TM5D15	GP2L-152	UC-5215	5HK-D15	
C7	1500			SI1500	D6-152	TM5D15	GP2L-152	UC-5215	5HK-D15	
C8	1500			SI1500	D6-152	TM5D15	GP2L-152	UC-5215	5HK-D15	
C9	100			SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C10	100			SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C11	15			SI15	D6-150		GP1K-150	UC-5415	5GA-Q15	
C12	68			SI68	D6-680		GP1K-680	UC-5468	5GA-Q68	
C13	68			SI68	D6-680		GP1K-680	UC-5468	5GA-Q68	
C14	5000			BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C15	5000			BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C16	5000			BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C17	1500			SI1500	D6-152	TM5D15	GP2L-152	UC-5215	5GA-D15	
C18	10000			BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-D1	
C19	10000			BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C20	10000			BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C21	10000			BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C22	10000			BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C23	100			SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C24	10000			BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C25	10000			BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C26	10000			BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C27	5000			BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D1	
C28	10000			BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C29	10000			BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C30	5000			BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C31	5000			BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	Note 2
C32	.1	600		P688-1	DF-104	PTE6P1		PT601	6TM-P1	Note 2
C33	5000			BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C34	5000			BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C35	5000			BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C36	5000			BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C37	5000			BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C38	5000			BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C39	5000			BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C40	5000			BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C41	390	500		1468-0004	D6-391	5W5T4	GP2K-390	MC-243	1FM-34	
C42	390	500		1468-0004	D6-391	5W5T4	GP2K-390	MC-243	1FM-34	
C43	.1	600		P688-1	DF-104	PTE6P1		PT601	6TM-P1	

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: SCOTT PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R26	33KΩ	½		BTS-33K	Note 1
R27	120Ω	½		BTS-120	
R28	4700Ω	½		BTS-4700	
R29	1000Ω	½		BTS-1000	
R30	100Ω	½		BTS-100	Note 2
R31	47KΩ	½		BTS-47K	
R32	22KΩ	½		BTS-22K	
R33	47KΩ	½		BTS-47K	
R34	1Meg	½		BTS-1Meg	
R35	120Ω	½		BTS-120	
R36	10KΩ	½		BTS-10K	
R37	1000Ω	½		BTS-1000	
R38	100KΩ	½		BTS-100K	
R39	22KΩ	½		BTS-22K	
R40	4700Ω	½		BTS-4700	
R41	1000Ω	½		BTS-1000	
R42	100KΩ	½		BTS-100K	
R43	47KΩ	½		BTS-47K	
R44	470KΩ	½		BTS-470K	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: SCOTT PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R65	1250Ω	5		1 3/4A-1250	
R66	220KΩ	½		BTS-220K	
R67	680Ω	½		BTS-680	
R68	10KΩ	1		BTA-10K	
R69	10KΩ	1		BTA-10K	
R70	470KΩ	½		BTS-470K	
R71	180Ω	5		1 3/4A-200	
R72	470KΩ	½		BTS-470K	
R73	300Ω	5		1 3/4A-300	
R74	1100Ω	5		1 3/4A-1100	
R75	1250Ω	5		1 3/4A-1250	
R76	6800Ω	½		BTS-6800	
R77	68KΩ	½		BTS-68K	
R78	47KΩ	½		BTS-47K	
R79	3.3Meg	½		BTS-3.3Meg	
R80	220KΩ	½		BTS-220K	
R81	33KΩ	½		BTS-33K	
R82	27KΩ	½		BTS-27K	

Note 1. Not used in all models.
Note 2. Some models use a 120Ω resistor in this application.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: SCOTT PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: MERIT PART No.	REPLACEMENT DATA: CHICAGO PART No.	REPLACEMENT DATA: TRIAD PART No.
T1	117VAC @1.25A	655VCT .150ADC	5VAC @2.8A	6.3VAC @ 6.4A	2PF-67				TR-16A

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: SCOTT PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: MERIT PART No.	REPLACEMENT DATA: CHICAGO PART No.	REPLACEMENT DATA: TRIAD PART No.	NOTES
T2	4KΩ	16Ω tap @6.8Ω	150ΩCT	.74Ω @ .4Ω	C-2699				TS-33A	

SPEAKER

ITEM No.	RATINGS: SIZE	RATINGS: FIELD	RATINGS: V. C. IMP.	REPLACEMENT DATA: SCOTT PART No.	REPLACEMENT DATA: JENSEN PART No.	REPLACEMENT DATA: QUAM PART No.	NOTES
SP1	15"		16Ω	SRC-10055	ST-830 Mod. K-310	15A10C0	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: SCOTT PART No.	REPLACEMENT DATA: MERIT PART No.	NOTES
L1	FM Ant. Coil	0Ω				
L2	FM RF Choke	0Ω				
L3	FM RF Coil	0Ω				
L4	Fil. Choke	0Ω				
L5	FM Osc. Coil	0Ω				
L6	FM RF Choke	1Ω				
L7	AM Loop Ant.	.2Ω	2.2Ω			
L8	AM Loop Ant. Loading Coil	.2Ω				
L9	AM RF Coil	130Ω	4Ω	20V4620	BC-383 *	
L10	AM Osc. Coil	3.6Ω		20V4621	BC-384 *	Tap @ 3.3Ω
L11	1st. FM IF	1.2Ω	1Ω	20V4623	FM-254 *	
L12	1st. AM IF	9.5Ω	9.5Ω	20Y5233		
L13	2nd. FM IF	1.2Ω	1Ω	20V4623	FM-254 *	
L14	2nd. AM IF	9.5Ω	9.5Ω	2045233		
L15	Fil. Choke	0Ω				
L16	3rd. FM IF	1.2Ω	1Ω	20V4623	FM-254 *	
L17	Ratio Det.	1.6Ω	0Ω	20V4624	FM-252 *	Tertiary Winding 0Ω

* Drill one new mtg. hole

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA SCOTT PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C44	1500			SI1500	D6-152	TM5D15	GP2L-152	UC-5215	5HK-D15	
C45A	100			SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
B	100			SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C46	100			SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C47	.02	200		P488-02	DF-203	PTE4S2		PT412	2TM-S2	
C48	5000			BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C49	.02	200		P488-02	DF-203	PTE4S2		PT412	2TM-S2	
C50	.02	200		P488-02	DF-203	PTE4S2		PT412	2TM-S2	
C51	.02	200		P488-02	DF-203	PTE4S2		PT412	2TM-S2	
C52	.02	200		P488-02	DF-203	PTE4S2		PT412	2TM-S2	
C53	100			SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C54	.1	600		P688-1	DF-104	PTE6P1		PT601	6TM-P1	
C55	.01	600		P688-01	D6-103	PTE6S1	GP2-333-103	PT611	6TM-S1	
C56	.005	600		P688-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5	
C57	.005	600		P688-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5	
C58	.02	200		P488-02	DF-203	PTE4S2		PT412	2TM-S2	
C59	.05	600		P688-05	DF-503	PTE6S5		PT615	6TM-S5	
C60	.005	600		P688-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5	Note 2
C61	.05	600		P688-05	DF-503	PTE6S5		PT615	6TM-S5	
C62	.05	600		P688-05	DF-503	PTE6S5		PT615	6TM-S5	
C63	.05	600		P688-05	DF-503	PTE6S5		PT615	6TM-S5	
C64	.05	600		P688-05	DF-503	PTE6S5		PT615	6TM-S5	
C65	.02	200		P488-02	DF-203	PTE4S2		PT412	2TM-S2	
C66	.05	600		P688-05	DF-503	PTE6S5		PT615	6TM-S5	
C67	.01	600		689ZGXY-01		PJ6S1		PT611	6TM-S1	
C68	.01	600		689ZGXY-01		PJ6S1		PT611	6TM-S1	
C69	6									Note 2

Note 1. C3D is not used in all models. In this case C1 is replaced by a 3-section unit.
Note 2. Not used in all models.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA SCOTT PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500KΩ	½	70V4584	Q11-133	AG-48-S	B-59	U-50	Bass
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
R2A	500KΩ	½	70V4584	Q11-133	AG-58-S	B-59	U-50	Treble
B	Shaft		Not Req.	Not Req.	KS-3	Not Req.	Not Req.	Attach to R2A
R3A	5000Ω	½	60Y5240	Q11-114	AG-19-S	B-10	U-14	Sensitivity
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attaoh to R3A
R4A	500KΩ	½	70V4583	Q18-133X	AT-88	BT-66	UT-429	Volume-Tapped@ 50KΩ
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R4A
R5A	1Meg	½	70Y5241	Q11-137	AG-61-S	AB-69	SU-54	Tuning eye
B	Shaft		Not Req.	RQ	FKS-1/4	AK-1	Not Req.	Attach to R5A

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA SCOTT PART No.	IRC PART No.	NOTES
R6	180Ω	½		BTS-180	
R7	33KΩ	½		BTS-33K	
R8	1000Ω	½		BTS-1000	
R9	4.7Meg	½		BTS-4.7Meg	
R10	47KΩ	1		BTA-47K	
R11	22KΩ	½		BTS-22K	
R12	4700Ω	½		BTS-4700	
R13	33KΩ	½		BTS-33K	Note 1
R14	33KΩ	½		BTS-33K	Note 1
R15	120Ω	½		BTS-120	
R16	4700Ω	½		BTS-4700	
R17	1000Ω	½		BTS-1000	
R18	33KΩ	½		BTS-33K	Note 1
R19	33KΩ	½		BTS-33K	Note 1
R20	1Meg	½		BTS-1Meg	Note 1
R21	120Ω	½		BTS-120	
R22	4700Ω	½		BTS-4700	
R23	1000Ω	½		BTS-1000	
R24	1Meg	½		BTS-1Meg	Note 1
R25	33KΩ	½		BTS-33K	Note 1

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA SCOTT PART No.	IRC PART No.	NOTES
R45	22KΩ	½		BTS-22K	
R46	1Meg	½		BTS-1Meg	
R47	1Meg	½		BTS-1Meg	
R48	2.2Meg	½		BTS-2.2Meg	
R49	7500Ω	5		1 3/4A-7500	
R50	27KΩ	½		BTS-27K	
R51	4.7Meg	½		BTS-4.7Meg	
R52	100KΩ	½		BTS-100K	
R53	47KΩ	½		BTS-47K	
R54	22KΩ	½		BTS-22K	
R55	100KΩ	½		BTS-100K	Note 1
R56	2200Ω	½		BTS-2200	
R57	47KΩ	½		BTS-47K	
R58	56Ω	½			
R59	560Ω	½		BTS-560	
R60	100KΩ	½		BTS-100K	Note 1
R61	1500Ω	½		BTS-1500	
R62	10KΩ	½		BST-10K	
R63	220KΩ	½		BTS-220K	
R64	1000Ω	½		BTS-1000	Note 1

PARTS LIST AND DESCRIPTIONS (Continued)

FUSES

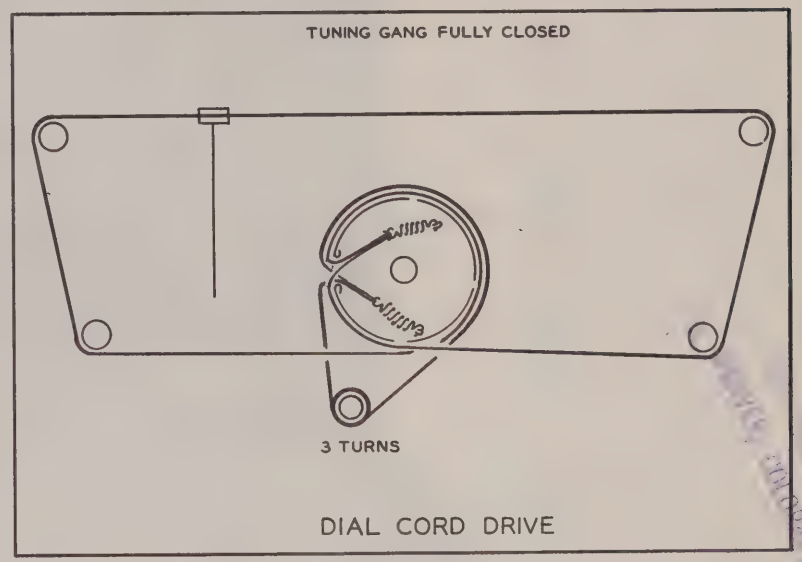
ITEM No.	TYPE	RATING	REPLACEMENT DATA SCOTT PART No. FUSE	SCOTT PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
MI	3AG	3A-250 V.			312003	342001	AGC-3	HKP

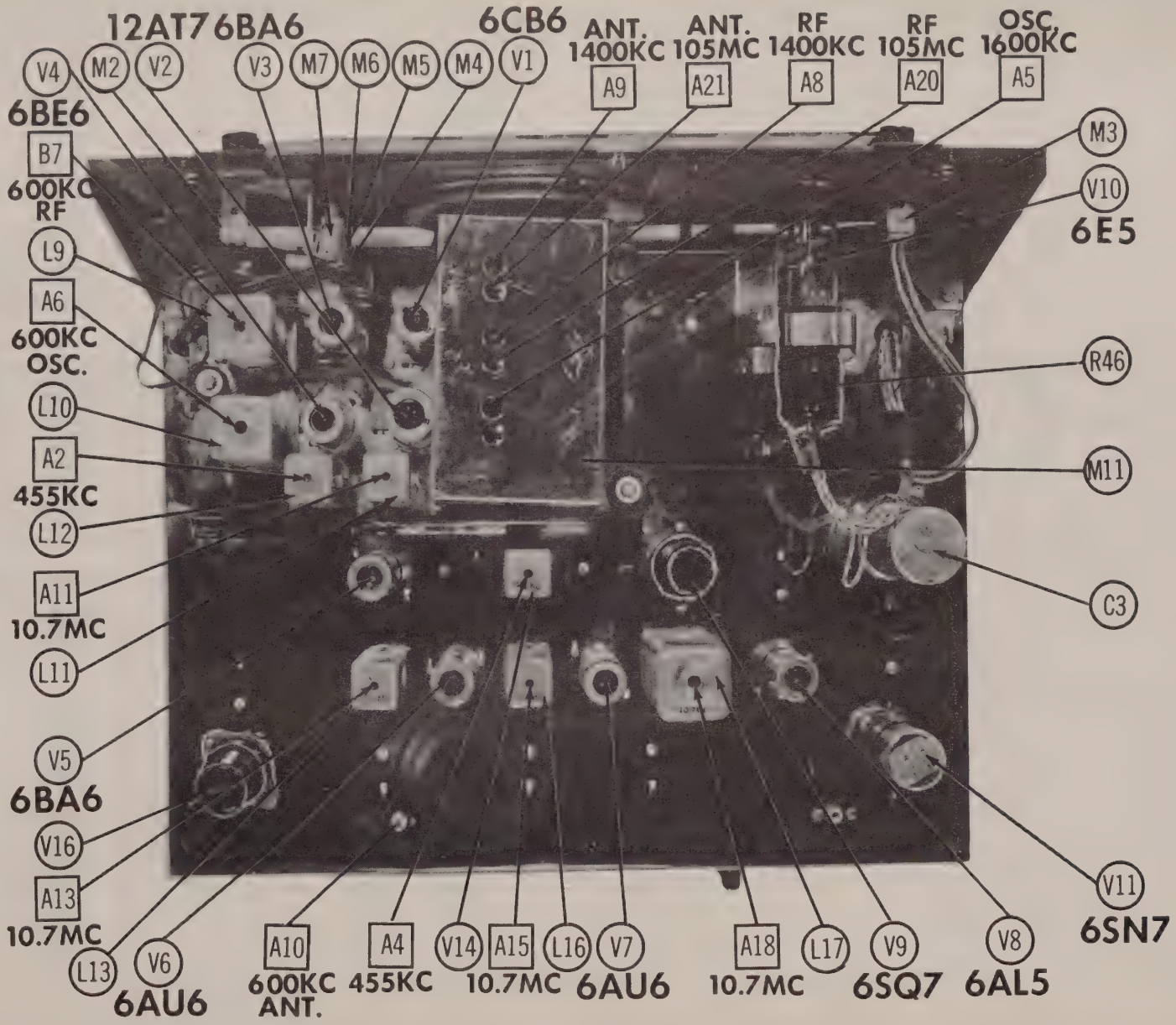
DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA SCOTT PART No.		NOTES
M2 Thru M8	Bayonet	6-8	.15	Brown			Type #47

MISCELLANEOUS

ITEM No.	PART NAME	SCOTT PART No.	NOTES
M9	Switch		on/off
M10	Switch		Function Selector
M11	3 Gang Var. Cap		(9-525MMF, 9-525MMF, 29-215MMF)
A19	Trimmer		FM Osc. Adj. (.5-5MMF)




12AT7
6BA6
6CB6
ANT. 1400KC
ANT. 105MC
RF 1400KC
RF 105MC
OSC. 1600KC
V4
M2
V2
V3
M7
M6
M5
M4
V1
A9
A21
A8
A20
A5
M3
V10
6E5
6BE6
B7
600KC RF
L9
A6
600KC OSC.
L10
A2
455KC
L12
A11
10.7MC
L11
R46
M11
C3
V5
6BA6
V16
A13
10.7MC
L13
V6
6AU6
A10
600KC ANT.
A4
455KC
V14
A15
10.7MC
L16
V7
6AU6
A18
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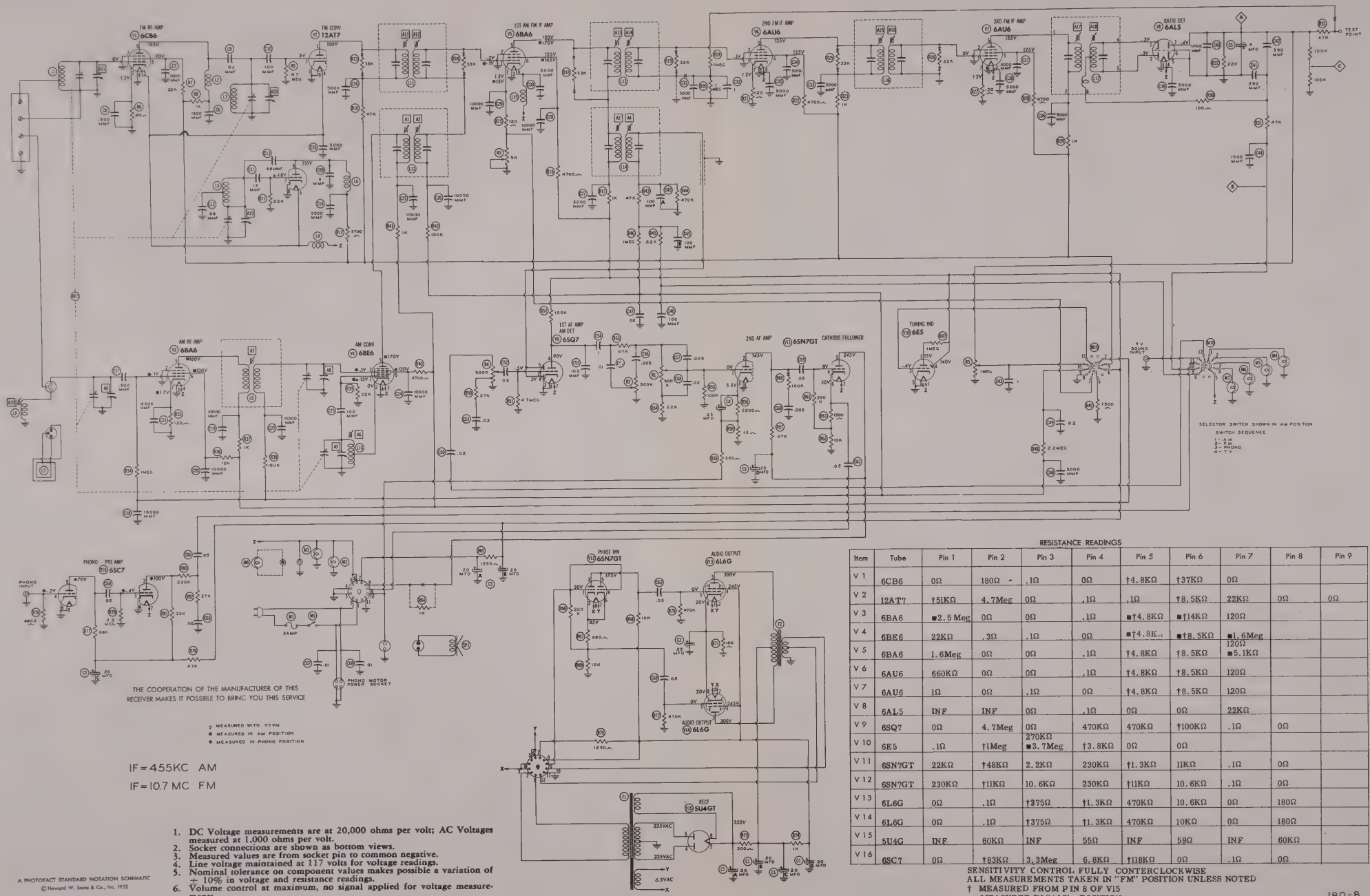
L17
V9
6SQ7
V8
6AL5
V11
6SN7



THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRINC YOU THIS SERVICE

? MEASURED WITH VTVM
■ MEASURED IN AM POSITION
◆ MEASURED IN PHONO POSITION

IF = 455KC AM
IF = 10.7 MC FM

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6CB6	0Ω	180Ω -	.1Ω	0Ω	†4.8KΩ	†37KΩ	0Ω		
V 2	12AT7	†5IKΩ	4.7Meg	0Ω	.1Ω	.1Ω	†8.5KΩ	22KΩ	0Ω	0Ω
V 3	6BA6	■2.5 Meg	0Ω	0Ω	.1Ω	■†4.8KΩ	■†14KΩ	120Ω		
V 4	6BE6	22KΩ	.3Ω	.1Ω	0Ω	■†4.8K..	■†8.5KΩ	■1.6Meg		
V 5	6BA6	1.6Meg	0Ω	0Ω	.1Ω	†4.8KΩ	†8.5KΩ	120Ω ■5.1KΩ		
V 6	6AU6	660KΩ	0Ω	0Ω	.1Ω	†4.8KΩ	†8.5KΩ	120Ω		
V 7	6AU6	1Ω	0Ω	.1Ω	0Ω	†4.8KΩ	†8.5KΩ	120Ω		
V 8	6AL5	INF	INF	0Ω	.1Ω	0Ω	0Ω	22KΩ		
V 9	6SQ7	0Ω	4.7Meg	0Ω	470KΩ	470KΩ	†100KΩ	.1Ω	0Ω	
V 10	6E5	.1Ω	†1Meg	270KΩ ■3.7Meg	†3.8KΩ	0Ω	0Ω			
V 11	6SN7GT	22KΩ	†48KΩ	2.2KΩ	230KΩ	†1.3KΩ	1IKΩ	.1Ω	0Ω	
V 12	6SN7GT	230KΩ	†1IKΩ	10.6KΩ	230KΩ	†1IKΩ	10.6KΩ	.1Ω	0Ω	
V 13	6L6G	0Ω	.1Ω	†375Ω	†1.3KΩ	470KΩ	10.6KΩ	0Ω	180Ω	
V 14	6L6G	0Ω	.1Ω	†375Ω	†1.3KΩ	470KΩ	10KΩ	0Ω	180Ω	
V 15	5U4G	INF	60KΩ	INF	55Ω	INF	59Ω	INF	60KΩ	
V 16	6SC7	0Ω	†83KΩ	3.3Meg	6.8KΩ	†118KΩ	0Ω	.1Ω	0Ω	

SENSITIVITY CONTROL FULLY CONTERCLOCKWISE
ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS NOTED
† MEASURED FROM PIN 8 OF V15
■ MEASURED IN "AM" POSITION

180-8

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning gang fully open and set pointer midway between the two zeros in "100" on the 0 to 100 scale.
Set the sensitivity control at maximum.
Use insulated alignment tools.

AM ALIGNMENT

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	High side to stator lug on the middle AM section of tuning gang. Low side to chassis.	455KC (Unmod)	AM	Tuning gang fully open.	Not used.	A1, A2, A3, A4	Adjust for maximum closure of tuning eye. Attenuate generator output to prevent complete closure of tuning eye.
2.	"	"	1600KC	"	1600KC	"	A5	"
3.	"	"	600KC	"	600KC	"	A6, A7	Check tracking at 600KC. If necessary adjust A6 and A7 in order given for maximum closure of tuning eye. Repeat steps 2 and 3 until no further improvement is noted.
4.		Loop	1400KC	"	Tune to 1400KC signal.	"	A8, A9	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum closure of tuning eye
5.		"	600KC	"	Tune to 600KC signal	"	A10	"

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Short across C32 to chassis.
Connect two matched 100KΩ (±1%) resistors in series from Point Ⓐ to chassis. The junction of these two resistors is alignment Point Ⓒ as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
6.	.01MFD	High side to pin 2 (grid) of 12AT7 (V2) Low side to chassis	10.7MC (Unmod.)	FM	Tuning gang fully open	DC probe to point Ⓐ. Common to chassis.	A11, A12 A13, A14 A15, A16 A17	Adjust for maximum deflection. Attenuate generator to maintain min imum usable deflection on VTVM.
7.	"	"	"	"	"	DC probe to point Ⓑ. Common to point Ⓒ.	A18	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Short across C32 to chassis.
Use frequency modulated signals with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	SCOPE CONNECT	ADJUST	REMARKS
6.	.01MFD	High side to pin 2 (grid) of 12AT7 (V2) Low side to chassis.	10.7MC (450KC Swp)	FM	Tuning gang fully open	Vert. amp. to point Ⓐ. Low side to chassis.	A11, A12 A13, A14 A15, A16 A17	Disconnect stabilizer capacitor C5. Adjust for curve of maximum amplitude and symmetry as per fig. 1.
7.	"	"	"	"	"	Vert. amp. to point Ⓑ Low side to chassis.	A18	Reconnect capacitor C5. Adjust so that 10.7MC occurs at center of crossover lines. SLIGHTLY retouch A17 for maximum amplitude and straightness of crossover lines as in fig. 2.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
8.	.01MFD	High side to pin 2 (grid) of 12AT7 (V2) Low side to chassis	107MC (Unmod.)	FM	107MC	DC probe to point Ⓐ. Common to chassis.	A19	Adjust for maximum deflection.
9.	Two 120Ω Carbon Resistors	Across FM antenna terminals with 120Ω in each lead.	105MC	"	Tune to 105MC signal	"	A20 A21	"

FIG. 1

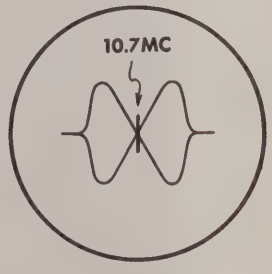
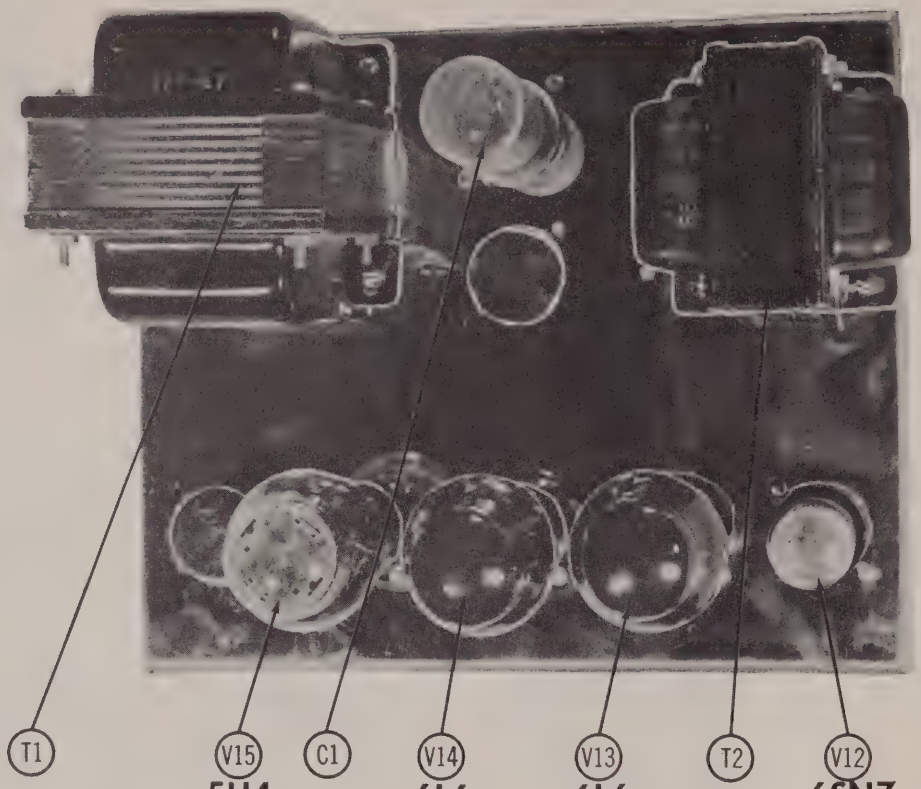
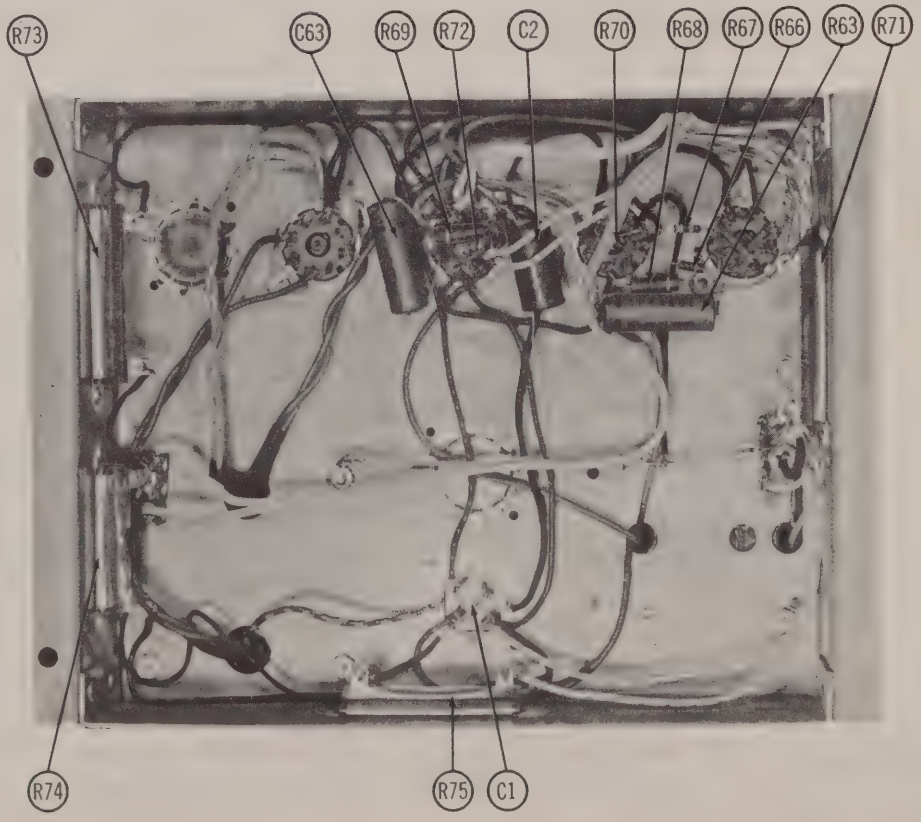
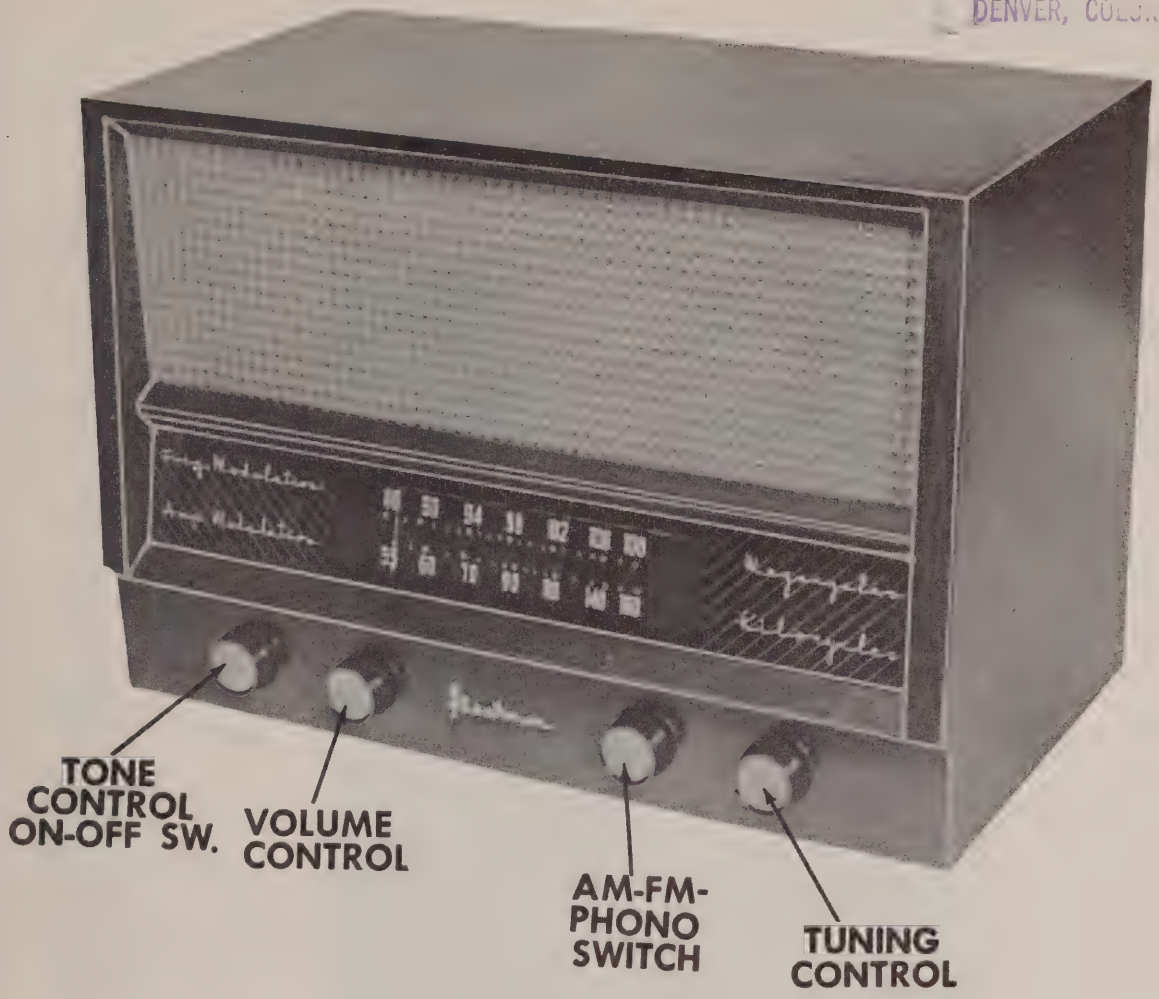


FIG. 2


T1
V15
5U4
C1
V14
6L6
V13
6L6
T2
V12
6SN7


R73
C63
R69
R72
C2
R70
R68
R67
R66
R63
R71
R74
R75
C1

L. P.
3921
DENVER, COLO.



STEELMAN
MODEL AF1100

TRADE NAME	Steelman Model AF1100		
MANUFACTURER	Steelman Phono & Radio Co., Inc., 12-30 Anderson Ave., Mt. Vernon, N.Y.		
TYPE SET	AC Operated AM-FM Superheterodyne Receiver		
TUBES (TEN)	Types 6BA6 FM RF Amp., 12AT7 FM Conv., 6BA6 AM RF Amp., 6BE6 AM Conv., 6BA6 1st. FM AM IF Amp., 6AU6 2nd. FM IF Amp., 6AL5 Ratio Det.-AVC-AF Amp., 6V6GT Audio Output, 5Y3GT Rectifier.		
POWER SUPPLY	110-120 Volts AC-60 Cycle	RATING	.71 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	540-1510 KC	FREQ. MOD.	88-108 MC

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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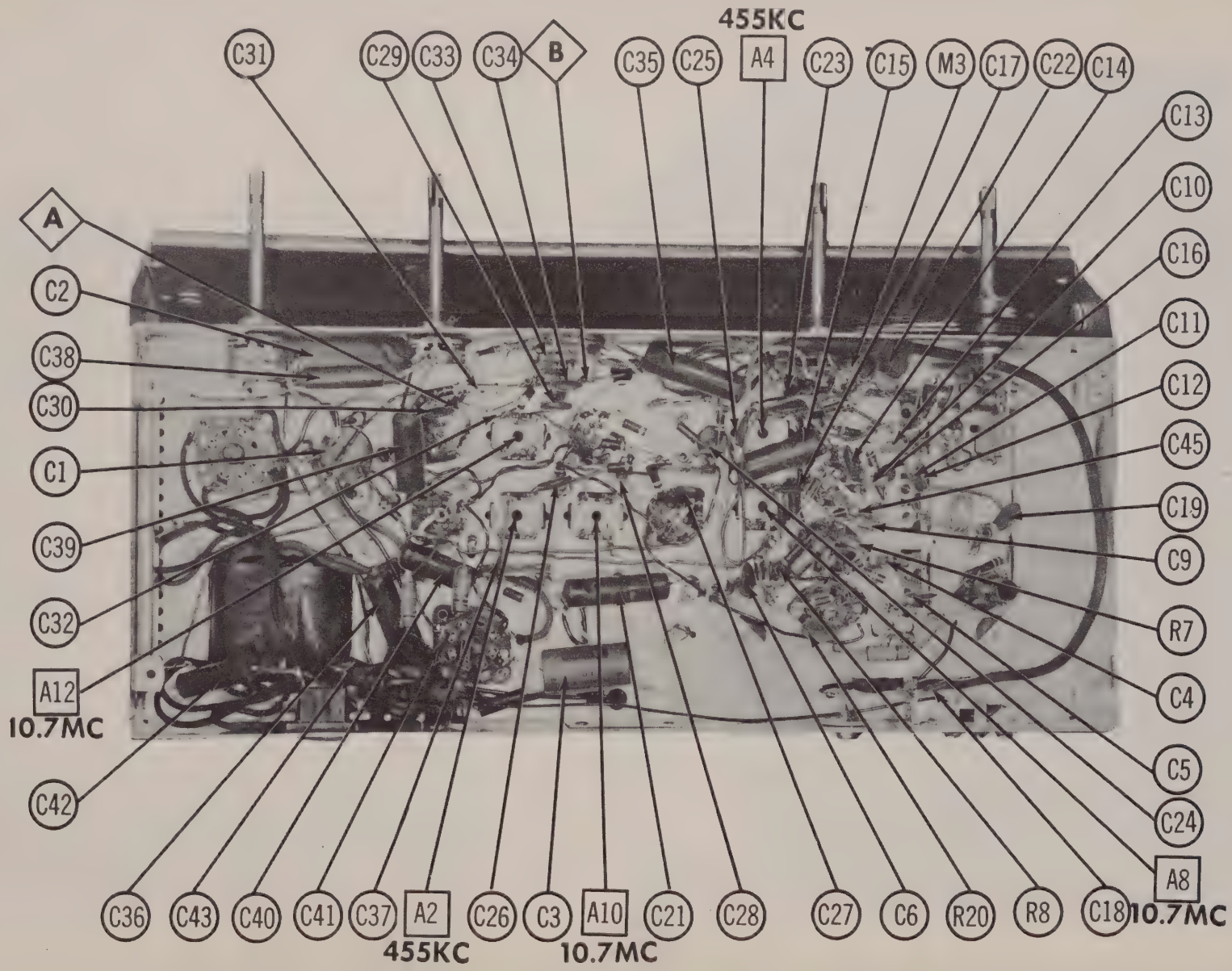
455KC
C31
C29
C33
C34
B
C35
C25
A4
C23
C15
M3
C17
C22
C14
C13
C10
C16
C11
C12
C45
C19
C9
R7
C4
C5
C24
A8
10.7MC
A
C2
C38
C30
C1
C39
C32
A12
10.7MC
C42
C36
C43
C40
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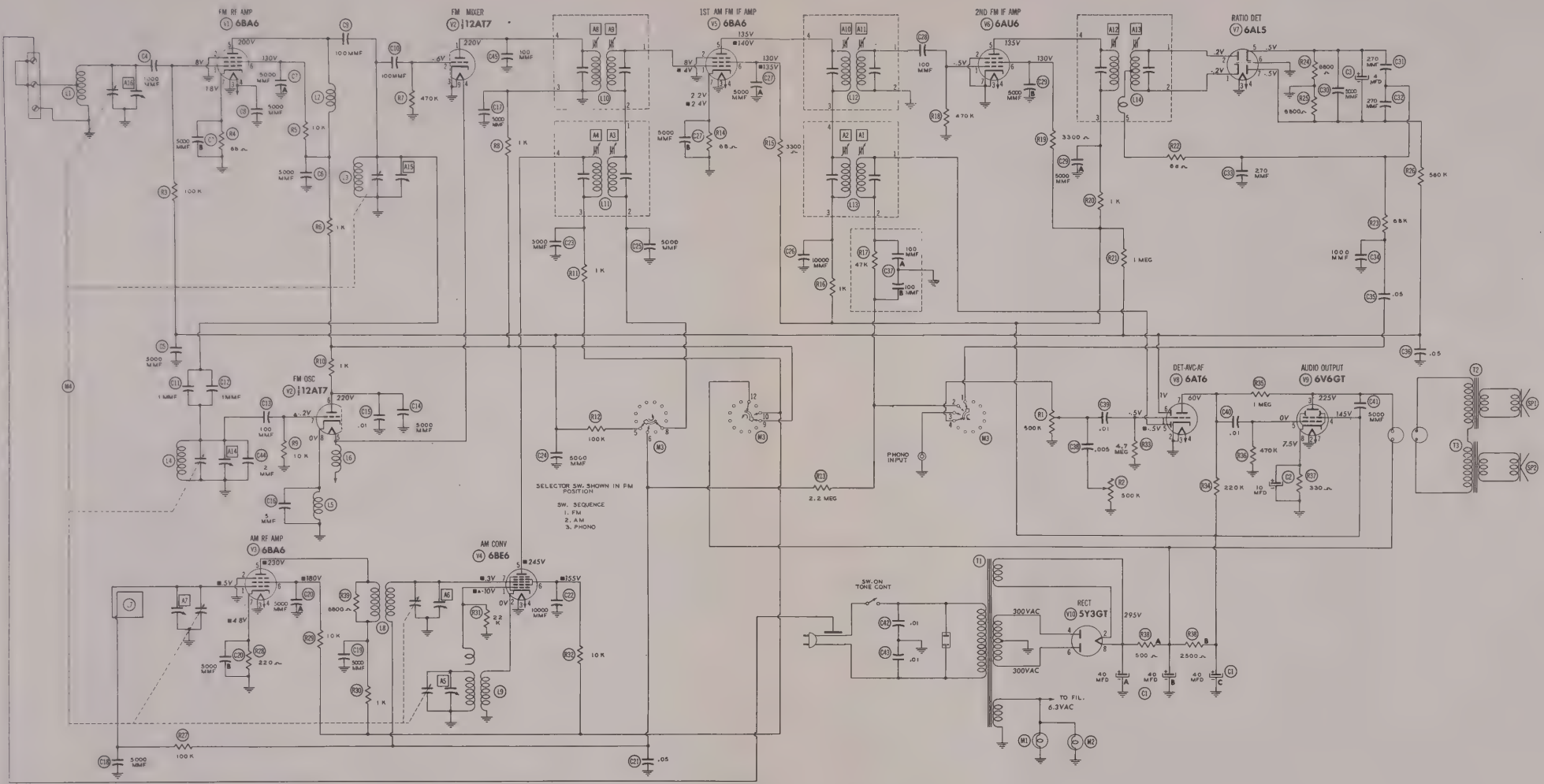
C6
R20
R8
C18



IF=455 KC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BA6	660KΩ	0Ω	0Ω	.1Ω	†1.5KΩ	†1KΩ	68Ω		
V 2	12AT7	†1.5KΩ	670KΩ	0Ω	.5Ω	.5Ω	†1.5KΩ	10KΩ	2Ω	0Ω
V 3	6BA6	3.8Meg	0Ω	0Ω	1Ω	≡†1.5KΩ	≡†10KΩ	220Ω		
V 4	6BE6	22KΩ 860KΩ	.4Ω	0Ω	.1Ω	≡†1.5KΩ	≡†10KΩ	2.7Meg		
V 5	6BA6	≡2.7Meg	0Ω	0Ω	.1Ω	†4KΩ	†6.5KΩ	68Ω		
V 6	6AU6	470KΩ	0Ω	0Ω	1Ω	†4KΩ	†6.5KΩ	0Ω		
V 7	6AL5	INF	INF	0Ω	1Ω	6.8KΩ	0Ω	6.8KΩ		
V 8	6AT6	4.7Meg	0Ω	0Ω	.1Ω	≡250KΩ	550KΩ	†190KΩ		
V 9	6V6GT	INF	0Ω	†1.5KΩ	†2KΩ	470KΩ	INF	.1Ω	330Ω	
V 10	5Y3GT	INF	55KΩ	INF	135Ω	INF	140Ω	INF	50KΩ	

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS NOTED
† MEASURED FROM PIN 8 OF V10
≡ MEASURED IN "AM" POSITION
▲ TAKEN WITH VACUUM TUBE VOLTMETER

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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180-9

STEELMAN
MODEL AF1100

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Turn tuning gang fully open and set pointer 4½ inches from right hand end of dial back plate.

AM ALIGNMENT

Loop should be maintaintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 6BE6 (V4). Low side to chassis.	455KC (400∿Mod)	AM	Tuning gang fully open.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output.
2.	"	"	1610KC	"	"	"	A5,	"
3.		Loop	1400KC	"	Tune to 1400KC	"	A6, A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4.	.001MFD	High side to pin 2 (grid) of 12AT7 (V2) Low side to chassis	10.7MC (Unmod)	FM	Tuning gang fully open.	DC probe to point (A). Common to chassis.	A8, A9 A10, A11 A12,	Adjust for maximum deflection Attenuate signal generator to minimum usable output.
5.	"	"	"	"	"	DC probe to point (B). Common to chassis.	A13	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	SCOPE CONNECT	ADJUST	REMARKS
4.	.001MFD	High side to pin 2 (grid) of 12AT7 (V2) Low side to chassis	10.7MC (450KC Swp)	FM	Tuning gang fully open.	Vert. amp. to point (A). Low side to chassis.	A8, A9, A10, A11 A12	Disconnect stabilizer capacitor C3. Adjust for curve of maximum amplitude and symmetry as per fig. 1.
5.	"	"	"	"	"	Vert amp. to point (B). Low side to chassis.	A13	Reconnect capacitor C3. Adjust so that 10.7MC occurs at center of crossover lines. SLIGHTLY retouch A12 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
6	.001MFD	High side to pin 1 (grid) of 6BA6 (V1) Low side to chassis	108MC (Unmod)	FM	108MC (tune pointer to 3/8 inch from maximum right hand travel.	DC probe to point (A). Common to chassis	A14	Adjust for maximum deflection.
7.	270Ω Carbon rsisstor	High side thru 270Ω to FM Antenna terminal. Low side to chassis.	10 6MC (Unmod)	"	Tune to 106MC signal.	"	A15, A16	"

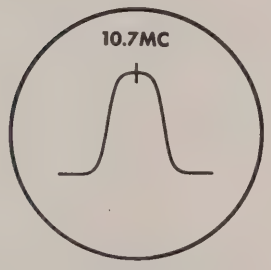


FIG. 1

FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: STEELMAN PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V1	FM RF Amplifier	6BA6	6BA6	7BK	
V2	FM Converter	12AT7	12AT7	9A	
V3	AM RF Amplifier	6BA6	6BA6	7BK	
V4	AM Converter	6BE6	6BE6	7CH	
V5	1st. FM AM Amplifier	6BA6	6BA6	7BK	
V6	2nd. FM Amplifier	6AU6	6AU6	7BK	
V7	Ratio Detector	6AL5	6AL5	6BT	
V8	Det. -AVC-AF Amp.	6AT6	6AT6	7BT	
V9	Audio Output	6V6GT	6V6GT	7AV	
V10	Rectifier	5Y3GT	5Y3GT	5T	

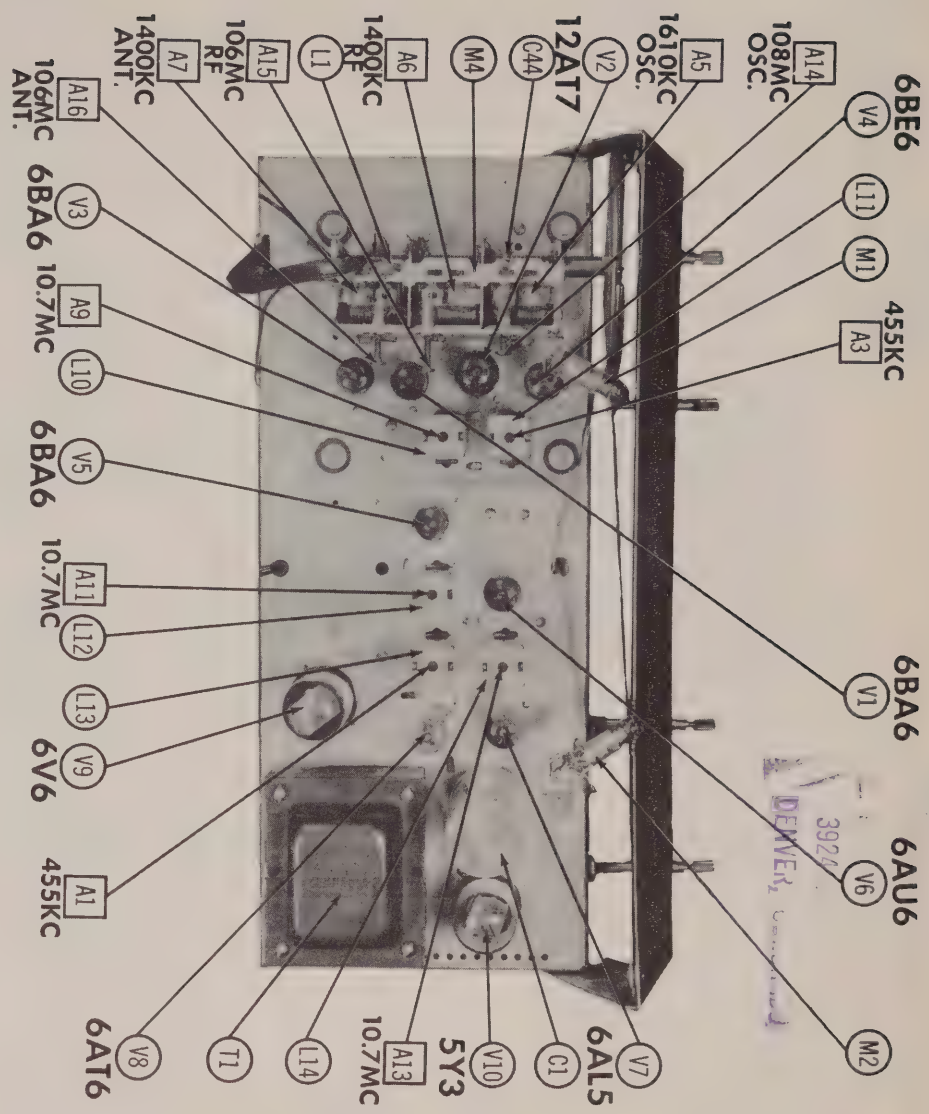
CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA: STEELMAN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	▲40	450		AFJ3-44		UPT44445		FP377	TVL-3787	
B	■40	450								
C	●40	450								
C2	10	25		PRS25/10		BR102A		TC22	TVA-1204	
C3	4	150		PRS150/4		BR415		TC40	TVA-1402	
C4	1000			SI1000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C5	5000			BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C6	5000			BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C7A	5000			BPD-005	DD-2-502	TM5D5	811-005	DC-525	5HK-D5	
B	5000			BPD-005		TM5D5	811-005	DC-525	5HK-D5	
C8	5000			BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C9	100			SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C10	100			SI100	L6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C11	1				TCZ-1		NPOK-010		5TCCB-V1	
C12	1				TCZ-1		NPOK-010		5TCCB-V1	
C13	100			SI100	D6-101	TM5T5	GP1K-101	UC-531	5GA-T1	
C14	5000			BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C15	.01	600		P688-01	D6-103	PTE6S1	GP2-333-103	PT611	6TM-S1	
C16	5			SI5NP0	TCZ-4.7		NPOK-050	ZT-555	5TCCB-V47	
C17	5000			BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C18	5000			BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C19	5000			BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C20A	5000			BPD-005	DD-2-502	TM5D5	811-005	DC-525	5HK-D5	
B	5000			BPD-005		TM5D5	811-005	DC-525	5HK-D5	
C21	.05	400		P488-05	DF-503	PTE4S5		PT415	4TM-S5	
C22	10000			BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C23	5000			BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C24	5000			BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C25	5000			BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C26	10000			BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C27A	5000			BPD-005	DD-2-502	TM5D5	811-005	DC-525	5HK-D5	
B	5000			BPD-005		TM5D5	811-005	DC-525	5HK-D5	
C28	100			SI100	D5-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C29A	5000			BPD-005	DD-2-502	TM5D5	811-005	DC-525	5HK-D5	
B	5000			BPD-005		TM5D5	811-005	DC-525	5HK-D5	
C30	5000			BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C31	270			SI270	D6-271		GP2K-271	UC-5327	5GA-T27	
C32	270			SI270	D5-271		GP2K-271	UC-5327	5GA-T27	
C33	270			SI270	D5-271		GP2K-271	UC-5327	5GA-T27	
C34	1000			BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C35	.05	400		P488-05	DF-503	PTE4S5		PT415	4TM-S5	
C36	.05	400		P488-05	DF-503	PTE4S5		PT415	4TM-S5	
C37A	100			SI100	♦PC-50	TM5T1	♦1403-01	UC-531	♦100C1	
B	100			SI100		TM5T1		UC-531		
C38	.005	600		P688-005	D5-502	PTE6D5	GP2-333-502	PT625	6TM-D5	
C39	.01	600		P688-01	D6-103	PTE6S1	GP2-333-103	PT611	6TM-S1	
C40	.01	600		P688-01	D6-103	PTE6S1	GP2-333-103	PT611	6TM-S1	
C41	5000			BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C42	.01	600		P688-01		PTE6S1		PT611	6TM-S1	
C43	.01	600		P688-01		PTE6S1		PT611	6TM-S1	
C44	2						N750K-020			
C45	100			SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	

♦ Items C37A, C37B R17 are combined in one unit.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	STEELMAN PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	500KΩ	½	VC-36	Q11-133	AG-58-S	AB-59	U-50	Volume
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R1A
R2A	500KΩ	½	VC-37	Q13-133	AG-60-Z	AB-60	U-48	Tone
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R2A
C	Switch		Not Req.	76-1	SWB	KB-1	US-26	Attach to R2A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	STEELMAN PART No.	IRC PART No.	
R3	100KΩ	½		BTS-100K	
R4	68Ω	½			
R5	10KΩ	1		BTA-10K	
R6	1000Ω	½		BTS-1000	
R7	470KΩ	½		BTS-470K	
R8	1000Ω	½		BTS-1000	
R9	10KΩ	½		BTS-10K	
R10	1000Ω	½		BTS-1000	
R11	1000Ω	½		BTS-1000	
R12	100KΩ	½		BTS-100K	
R13	2.2Meg	½		BTS-2.2Meg.	
R14	68Ω	½			
R15	3300Ω	½		BTS-3300	
R16	1000Ω	½		BTS-1000	
R17	47KΩ	½	♦	BTS-47K	
R18	470KΩ	½		BTS-470K	
R19	3300Ω	½		BTS-3300Ω	
R20	1000Ω	½		BTS-1000	
R21	1Meg	1		BTA-1Meg	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	PART No.	IRC PART No.	
R22	68Ω	½			
R23	68KΩ	½		BTS-68K	
R24	6800Ω	½		BTS-6800	
R25	6800Ω	½		BTS-6800	
R26	560KΩ	½		BTS-560K	
R27	100KΩ	½		BTS-100K	
R28	220Ω	½		BTS-220	
R29	10KΩ	1		BTA-10K	
R30	1000Ω	½		BTS-1000	
R31	22KΩ	½		BTS-22K	
R32	10KΩ	1		BTA-10K	
R33	4.7Meg	½		BTS-4.7Meg	
R34	220KΩ	½		BTS-220K	
R35	1Meg	1		BTA-1Meg	
R36	470KΩ	½		BTS-470K	
R37	330Ω	1		BTA-330	
R38A	500Ω	5			
B	2500Ω	5			
R39	6800Ω	½		BTS-6800	

♦ Items R17, C37A, C37B are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA				
	PRI.	SEC. 1	SEC. 2	SEC. 3	STEELMEN PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
T1	117VAC @ .71A	600VCT .100ADC	5VAC @ 2A	6.3VAC @ 3A	PT-1000			PH-120 ①	R-7B

① Drill new mtg. holes.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA					NOTES
	IMPEDANCE		DC RES.		STEELMAN PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	
	PRI.	SEC.	PRI.	SEC.						
T2	2KΩ	3.1Ω	168Ω	.42Ω	P-70-D	A-3332 ①	A-2928①	RO-2 ①	S-2X- ①	① Bend mtg. tabs down file out slots. Mount on original mounting bracket.
T3	4.15KΩ	3.2Ω	560Ω	.62Ω	1C-923-1	A-3877 ①	A-2930①	RO-8 ①	S-6X ①	

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	STEELMAN PART No.	JENSEN PART No.	QUAM PART No.	
SP1	4"	PM	3.1Ω	SP-40	St-113 Mod. P4-X	4A07	
SP2	6"	PM	3.2Ω	SP-60	St-108 Mod. P6-X	6J4	

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

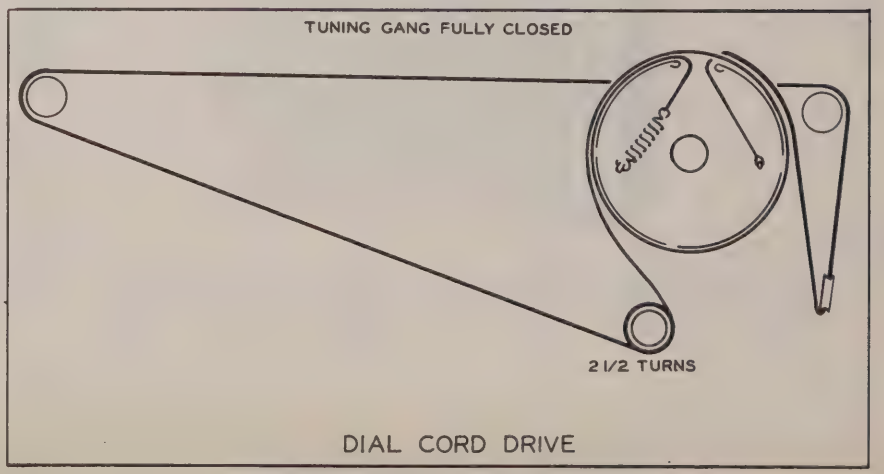
ITEM No.	USE	DC RES.		REPLACEMENT DATA		NOTES
		PRI.	SEC.	STEELMAN PART No.	MERIT PART No.	
L1	FM Ant. Coil	0Ω				
L2	FM RF Coil	.8Ω				
L3	FM Mixer - Grid Coil	0Ω				
L4	FM Osc. Coil	0Ω				
L5	Cathode Choke	.2Ω				
L6	Fil. Choke	.4Ω				
L7	AM Loop Ant	3.1Ω				
L8	AM RF Coil	33Ω	5Ω			
L9	AM Osc Coil	.4Ω	5.5Ω			
L10	1st. FM IF	.4Ω	.4Ω		FM254	
L11	1st AM IF	8.5Ω	8.5Ω		BC352	
L12	2nd FM IF	.4Ω	.4Ω		FM254	
L13	2nd AM IF	8.5Ω	8.5Ω		BC353	
L14	Ratio Det.	1.7Ω	.8Ω		FM255	Tertiary Winding .6Ω

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					STEELMAN PART No.		
M1	Bayonet	7.5	.2	White			Type No. #51
M2	Bayonet	7.5	.2	White			Type No. #51

MISCELLANEOUS

ITEM No.	PART NAME	STEELMAN PART No.	NOTES
M3	Switch		Band
M4	3 Gang Var. Cap.		(38-485MMF, 30-475MMF, 33-202MMF)



WILCOX-GAY MODELS
2A10, 2A10B, 2A11, 2A11B

Figure 1

GENERAL INFORMATION

The 2A Series Wilcox Gay "Recordio" features fingertip operation for Fast Forward, Playback, Stop, Record and Fast Reverse. The "Recordio" is designed to Record and Playback two tracks of material on standard width recording tape, which doubles the playing time of the standard 5" or 7" reel of tape with no loss of frequency response or quality. Recordings can be made from an external radio or phonograph in addition to those made directly from the microphone. Recordings can be played back through the self-contained speaker or an external speaker through the Auxiliary Speaker Jack.

The models in the 2A Series have two different tape speeds, Model 2A10, 2A10B having 7-1/2 and 3-3/4 inches per second, and Model 2A11, 2A11B having 3-3/4 and 1-7/8 inches per second.

Using both channels of the tape, the recording time for the various speeds is as follows:

Size	Speed 1-7/8	3-3/4	7-1/2
5 inch reel	2 hrs.	1 hr.	1/2 hr.
7 inch reel	4 hrs.	2 hrs.	1 hr.

The 2A Series is designed to operate on 60 cycle, 115 volt, AC supply.

Note: Severe damage will result if connection is made to a direct current (DC) line.

Manufactured by:
Wilcox - Gay Corporation
Charlotte, Michigan

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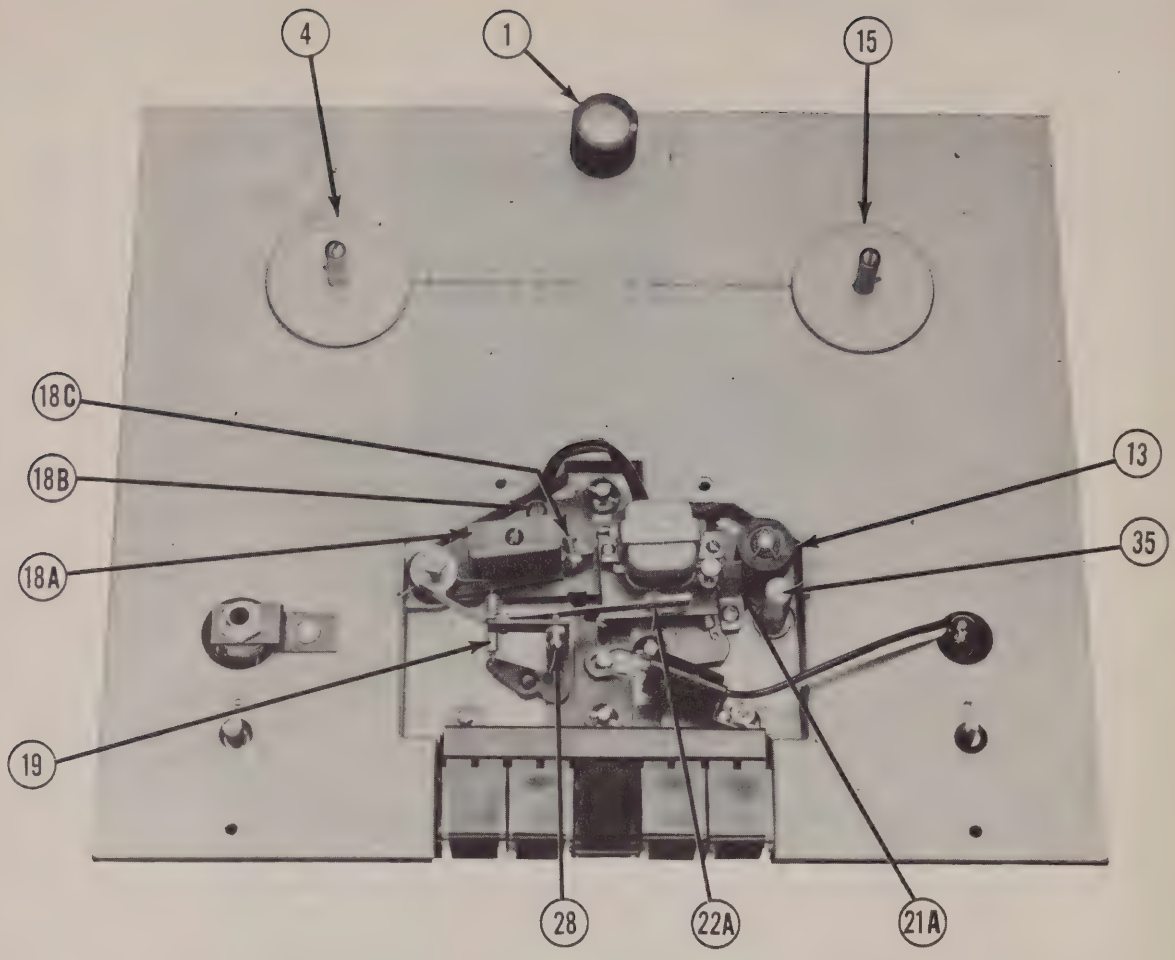

Figure 2

OPERATING INSTRUCTIONS

Threading the Tape -

1. Place a reel of tape on the left-hand spindle and an empty reel on the right-hand spindle making sure the reel slots engage the reel pin on the spindles.

2. Unwind about 14 inches of the tape from the reel. Hold a section of the tape straight with both hands and insert the tape in the tape slot making sure the dull coated side of the tape faces the rear of the recorder.

Note: This recorder requires tape with Type "A" winding, i.e. the (dull) coated side faces inward on the reel. In case the (dull) side faces outward Type "B" tape, it can be changed to Type "A" for use on this recorder by winding the tape with a half twist. The two types of tape are identical except the way in which they are wound on the reel.

3. Insert the free end of the tape through the hub of the right-hand take-up reel and place a pencil firmly over the tape, forcing it into one of the three slots on the hub of the empty reel. Turn the reel several turns with the pencil in this position until the tape is secured to the reel and all slack is taken up between the reels.

To Record from Microphone -

1. Turn the On-Off-Volume control knob to the On position and advance about one-half turn.

2. Turn the speed control knob to the desired speed.

Note: Recordings made at a certain speed must be played back at that speed.

3. Insert the Microphone plug into the Microphone jack located directly above the Tone Control.

4. Depress "Record" button down until it latches and with material being recorded, adjust Volume control to the point where a single round spot glows in the Recording Indicator.

Note: Recording level is correct when a single spot glows continuously when recording, and two round spots occasionally on peak passages.

To Record From External Radio -

Recordings can be made from a radio by placing the microphone near the loudspeaker of the radio; however, this type of recording may not be satisfactory as other sounds may be picked up by the microphone which as a result will be recorded on the tape. How-

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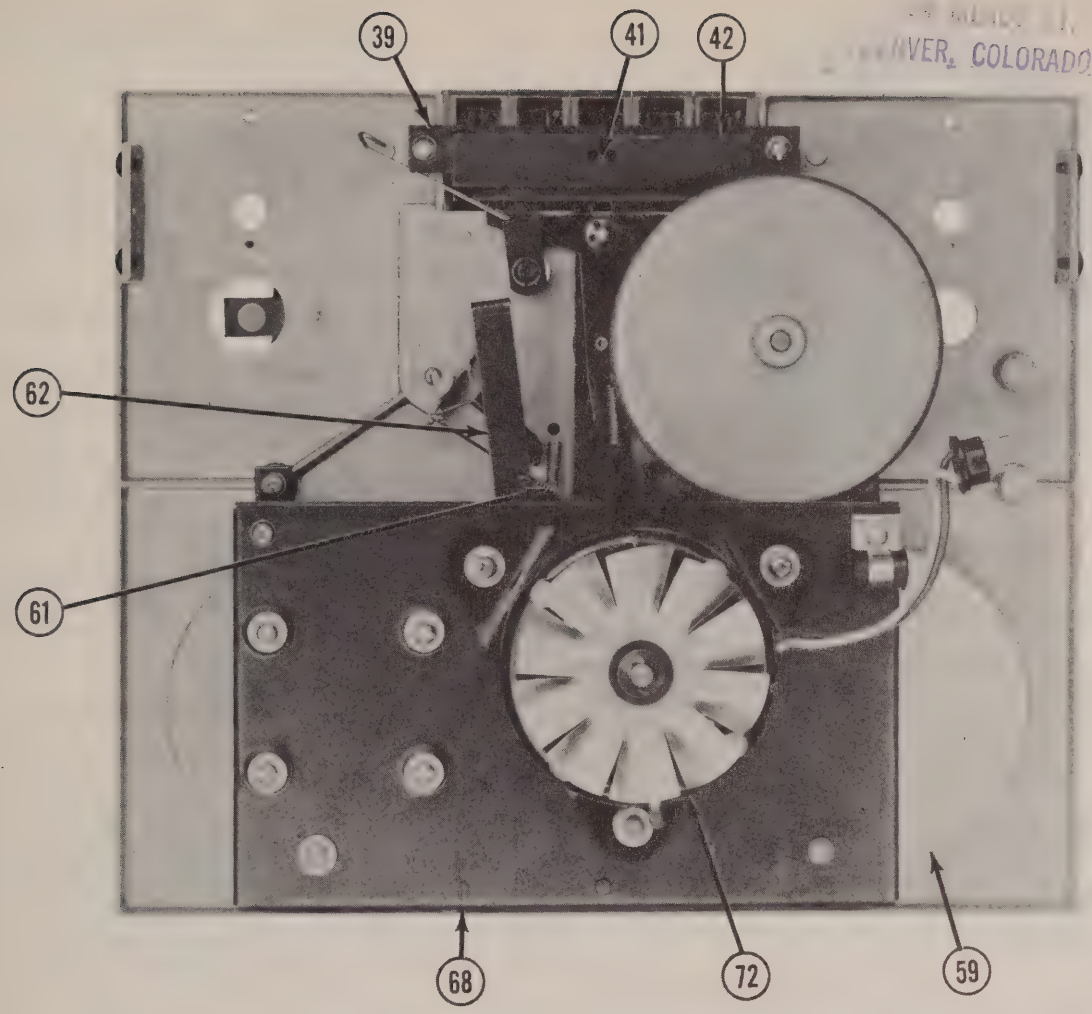

Figure 3

ever, a better quality recording can be made from a radio-phono recording cord ("Recordio" Part No. 2233), complete with plug, resistance network and clips which is connected as follows.

1. Insert the cord plug into the Microphone-Jack.

2. Connect the cord clips across the voice coil terminals on the radio speaker as shown in Figure 4.

3. Proceed as in "To Record From Microphone."

To Record From Phonograph -

1. Insert the radio-phono cord plug (See "To Record From External Radio") into the Microphone Jack.

2. Connect the alligator clips to the crystal leads on the external phonograph.

Note: The black wire on the cord is internally grounded on the "Recordio," therefore, this should always be connected to the ground side of the equipment being recorded.

3. Proceed as in "To Record from Microphone."

Dual Track Recording -

The Recordio is designed so that 1/2 the tape width is recorded at a time; thereby resulting in two track recording. This two track operation is accomplished in the following manner:

1. After a reel of tape has been recorded, i.e. all of the tape wound onto the take-up reel, depress the Stop push button. This stops all movement of the tape.

2. Remove the reels from the recorder, turning the full reel over and placing it on the left-hand spindle and the empty reel on the right-hand spindle.

3. Properly thread the tape and proceed with the recording as in "To Record From Microphone."

4. After this track has been recorded the first track of recording is ready to be played without rewinding.

(a) Place the full reel of tape on the feed reel (left-hand) spindle and the empty reel on the take-up (right-hand) spindle.

(b) Thread the tape making sure the dull side of the tape faces the recording head.

(c) Set the controls as described under "To Play a Recording."

Figure 4

To Play a Recording -

1. Thread the tape as described under "Threading The Tape."

2. Turn the On-Off-Volume control on and allow a few seconds for the tubes to warm up.

3. Press down on the Playback push button until it is latched into position.

4. Adjust the Volume and Tone control to suit.

To Use an External Speaker -

Any size speaker, of the permanent magnet type having a 3 ohm voice coil, may be used by connecting a speaker extension cord across the voice coil of the speaker then inserting the extension plug into the External Speaker jack located on the right-hand side of the cabinet. This automatically cuts out the self-contained speaker.

To Edit and Splice Tape -

In case tape is broken accidentally, or it is desired to edit the recordings, a splice may be made with scotch tape.

To splice the tape, overlap the ends of the tape approximately 1/2 inch making sure the tape is parallel, then cut the tape on an angle. Place the two ends together and apply scotch tape to the reverse, or uncoated side of the tape. The edges of the scotch tape should be trimmed even with the recording tape. It is suggested that colored scotch tape be used to mark the tape to show the desired divisions or passages. Do not use medicated adhesive tape as it is not suited for this purpose.

Fast Forward and Fast Rewind -

High-speed forward or reverse wind can be obtained by pressing the desired button. These are used primarily in locating a desired portion of a recording in a few seconds.

Caution: The "Stop" button should always be depressed before changing functions or speeds. Always depress the "Stop" button when the Recordio is not in use.

Erasing Recorded Material -

Erasing of recorded material takes place automatically when new material is recorded; therefore, no special step is necessary to erase recordings before new recordings are made. However, if a portion of a recording or an entire reel of tape is to be completely erased, do so as follows:

1. Properly thread the tape on the machine.

2. Turn the Volume control knob clockwise until a click is heard. This turns the recorder on.

3. Press down on the Record button until it latches into position. The erasing of recorder material is now in process and may be stopped at any time by depressing the "Stop" button.

Note: Only one track of recorded material is erased at a time. To erase the second track, reverse the reels and repeat the above operation.

To Use Recorder As A Public Address System -

The recorder may be used for public address with or without recording the material at the same time. Plug in an external speaker as described in To Use On External Speaker. Turn the recorder on and depress the Record button but do not use tape. Be careful to maintain sufficient distance between the microphone and the external speaker to prevent feedback howl. If it is desired to record the speech or address at the same time, thread the tape as previously described before depressing the Record button.

ADJUSTMENT

Disassembly Instructions -

1. Remove 2 Phillips head screws from rear of case.

2. Remove push-on type volume and tone control knobs.

3. Remove 2 screws located under volume and tone control knobs. Remove escutcheon.

4. Remove 2 Phillips head screws located under escutcheon.

5. Lift unit out of case, removing leads from speaker before removing unit completely.

Record-Play Head Adjustment - (See Figure 6)

To adjust the record-play head (22) for maximum response, make the following adjustment:

1. Remove the rear cover escutcheon (2).

2. Properly thread a good recorded tape on the machine.

3. Set the controls as described under "To Play a Recording."

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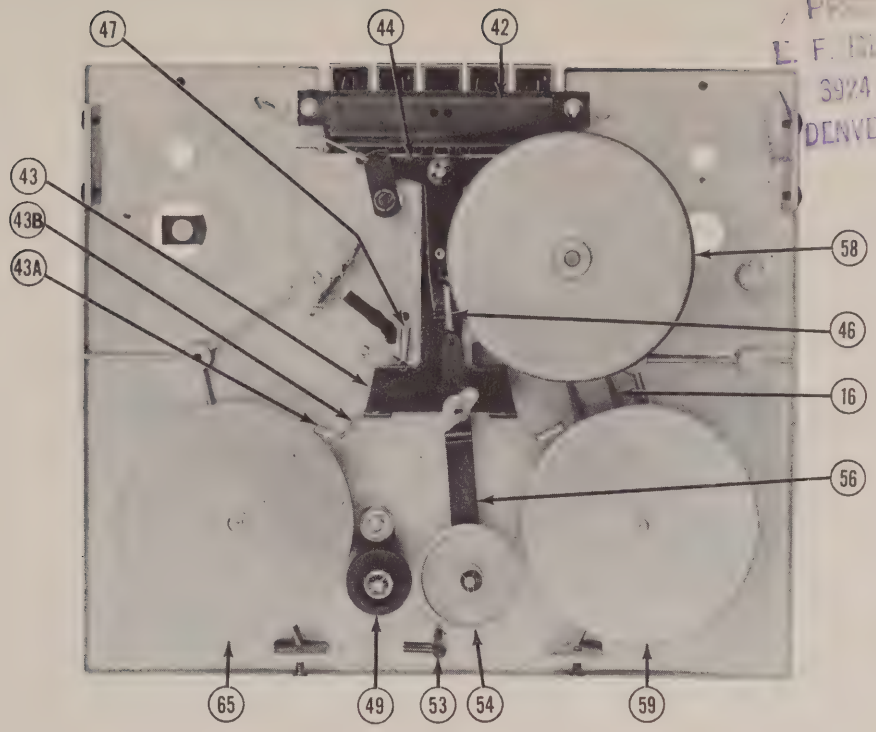


Figure 5

(a) For record-play head (22) mounted U-clamp: Loosen the bracket mounting screw (22A) see Figure 2, and move the head against the tape until maximum response is obtained. Hold the head in place and tighten the mounting screw.

(b) For side-mounted record-play head: Loosen the two bracket mounting screws and move the head against the tape for maximum response. Hold the head in position and tighten the screws.

4. Replace the rear cover escutcheon (2).

Pressure Pad Adjustment - (See Figure 6)

1. Remove the front and rear escutcheons (2 and 31).

2. Depress the "Play" button. Do not turn the recorder on.

3. Use a pencil type postal scale and check the amount of pressure necessary to just pull the pad away from the tape. The test should be made on the end of the pressure pad mounting spring (26). Adjust the pressure pad for 1-3/4 oz. ±1/4 oz. pressure.

(a) The record-head pressure pad is adjusted by the locked adjustment screw (28).

(b) The guide post pressure pad (29) is adjusted by bending the pressure pad spring. It must be adjusted for minimum pressure against the tape.

4. After the adjustments are made depress the "Stop" button and replace the trim covers.

Erase Head Adjustment -

1. With tape properly threaded, turn recorder on and depress the Record button. Allow tape to run for a few seconds then turn recorder off, but leave Record button depressed.

2. With the trim covers removed check the erase head (18A), see Figure 2, to see if it is parallel with the tape, if not loosen screw (18B) just enough so the head can be pivoted and align it with the tape then tighten the screw.

Caution: Make sure the head retracting spring (9), see Figure 6, remains in front of the erase head while adjusting it.

3. Check to see if the top edge of the tape coincides with the top end of the diagonal slot in the erase head (junction of long diagonal slot and short vertical slot). To adjust level of tape, loosen lock nut (5), see Figure 6, and rotate tape guide post (6) to move tape up or down. Tighten lock nut (5).

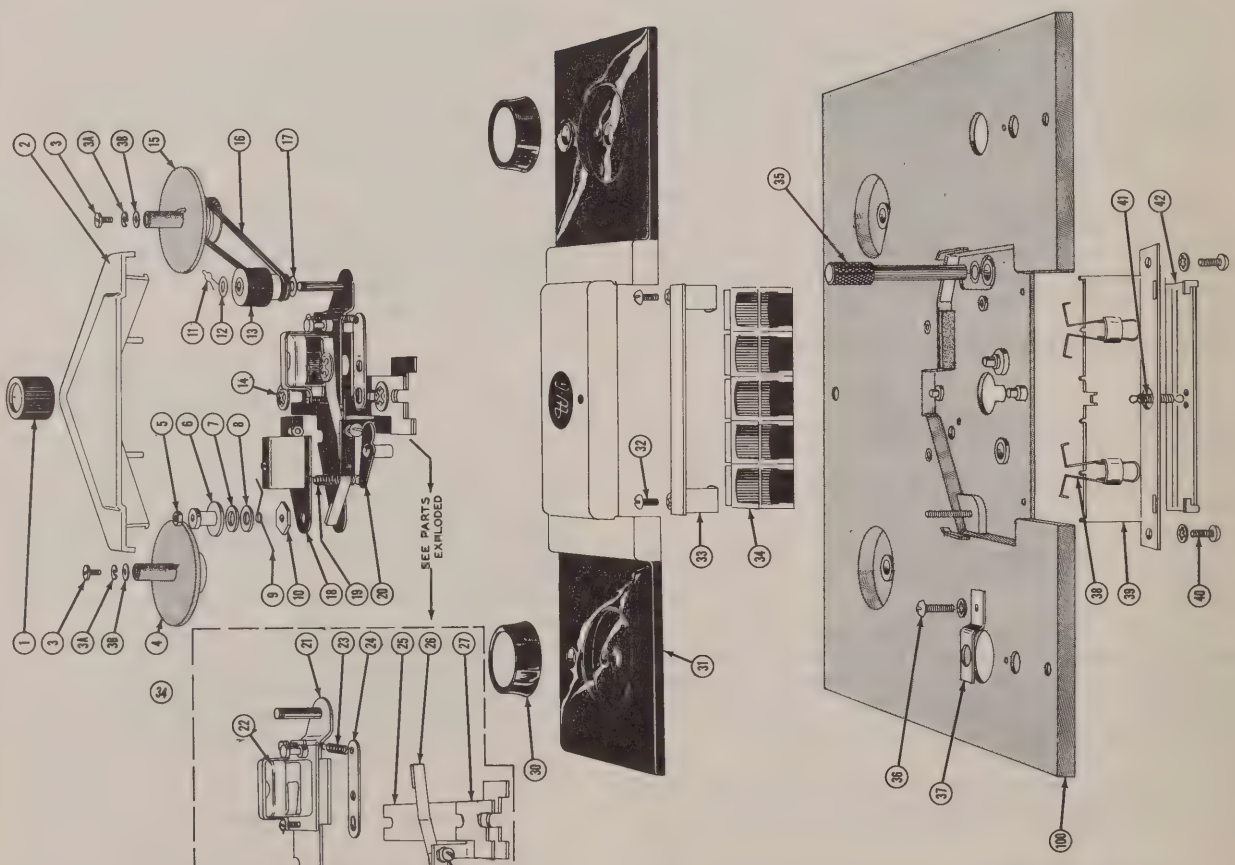
4. After this adjustment has been made, check to see if the tape moves forward approximately 1/64 inch when the "Record" button is depressed, if not, loosen the forward adjustment screw (18C) and turn the screw in or out as required to obtain this 1/64 inch adjustment. Tighten the lock nut.

5. Replace the trim covers.

Brake Shoe Adjustment - (See Figure 5)

1. In order to adjust the brake shoes, the complete mechanism must be removed from the carrying case and the speaker disconnected.

2. With all push buttons in the up position the brake shoes (43A) should clear the drums by a minimum of 1/16 inch.


SEE PARTS EXPLODED

NOTE: EXPLODED VIEW OF MOTOR & PULLEY MOUNTING ASSEMBLY - TOP VIEW
3/4 VIEW OF ITEM 76
NOTE: MOTOR & PULLEY MOUNTING ASSEMBLY
A PHOTOFACT "EXPLODED" VIEW
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Figure 6.

3. The adjustment is accomplished by bending the spring arm (43B).

Tape Sound (Monkey Chatter) During Fast Forward or Fast Rewind -

If during fast forward or fast rewind there is tape sound (Monkey Chatter) bend bracket (21A) forward so that the tape clears the recording head by approximately 1/32 inch with the Fast Forward or Rewind button depressed. See Figure 2.

Adjustment for Slow Take-Up Reel -

There are some instances where the spring drive belt (16), see Figure 5, stretches after a period of time. In this case, the drive belt (16) should be removed and shortened.

1. Clip off 3 to 5 turns of the spring belt.

Note: The spring belt is made so that one end will twist onto the tip of the other end. Therefore, clip the turns off the large end of the spring.

2. Twist the ends together and replace the belt.

Bias Adjustment -

Turn the Recorder on and depress the Record button, use no tape.

To determine if the bias is within satisfactory limits without dismantling the unit, merely connect a VTVM from the recording head to the chassis. If 55 to 85 volts are present in the 2A11, 2A11B series or if 75 to 100 volts are present in the 2A10, 2A10B series no adjustment is necessary.

If the readings are outside of this range proceed as follows:

1. Try a new 5879 or 6SJ7, 6AQ5 and 6X4.

2. If still not within range remove the chassis shield and connect a low capacity VTVM from pin #1 of the 6AQ5 to the chassis and adjust trimmer M4 (see Figure 8) to obtain a reading of 1.8 volts in the 2A11, 2A11B series or a reading of 2.25 volts in the 2A10, 2A10B series. This provides the optimum in performance.

TROUBLES

Push Buttons Fail to Latch into Position -

1. Lock plate spring (41) loose or missing resulting in the lock plate not held against the hinge bracket (39). See Figure 3.

Fails to Erase -

1. Spring (19) loose or broken resulting in the erase head (18A) not being pulled forward to engage the tape. See Figure 2.

2. Erase head not aligned properly. See "Erase Head Adjustment."

No Fast Forward or Reverse - (See Figure 5)

1. Idler lever tension spring (46) may be loose or broken, if so, the idler lever (56) will not be actuated. Replace spring (46).

2. Check the idler drive belt (57), see Figure 6 to see if it is properly connected.

No Drive on Record or Playback - (See Figure 6)

1. Idler tension spring (61) loose or broken thereby not holding the idler wheel (60) engaged with the motor pulley (81) and the flywheel (58).

2. Idler slide plate (79) binding on the slide bushing (78) thus preventing the idler from moving forward.

Tape Fails to Wind on Reel During Record or Playback -

1. Reel drive spring (16) broken. See Figure 5.

Speed Variation or "Wow" - (See Figure 6)

1. Check the capstan (35), pinch roller 13, idler (60), motor pulley (81) and flywheel (58) for oil or foreign material. Clean these parts with a good cleaning fluid.

2. Check the motor pulley (81) to see if it is secured to the motor shaft.

3. Check the idler tension spring (61) to see if it is holding the idler engaged with motor pulley and flywheel.

4. Idler slide plate (79) binding on the slide bushing (78) which may prevent the idler from making positive contact with motor pulley and flywheel.

Tape Reel Pan Loose - (See Figure 6)

1. Screw (3) holding either reel pan (4 or 15) is loose. Install a fibre washer between lockwasher and reel pan to prevent loosening. Remove unit from case and hold brake drum (59 or 65) while tightening screw.

Tape Overruns or Spills when Stop Button is Depressed During Fast Forward or Rewind-

1. Brake shoes out of adjustment. See "Brake Shoe Adjustment."

2. Brake pads may be worn out.

Failure to Record -

1. Tape pressure pad not adjusted properly resulting in the tape not being held against the recording head. See "Pressure Pad Adjustment."

2. Record head loose on its mounting. Adjust head and tighten into position as described under "Record-Play Head Adjustment."

3. Check the recording tape to see if the dull coated side faces inward on the reel. If the dull side faces outward, a recording cannot be made. If this condition exists wind the tape onto an empty reel in a half twist so the tape can be used on the recorder.

4. Laminations on the recording head dirty.

Note: The recording head and erase head are subject to an accumulation of tape coating residue, which is worn off as the tape passes. This must be periodically removed since it will cause distortion. This accumulation may be removed with carbon tetrachloride and a small cotton swab on the end of a toothpick. Be careful not to mar the lamination as they should be smooth to operate properly.

Howl in Playback -

1. Loud howl in playback when volume control set for high volume usually due to microphonic 6SJ7 or 5879 whichever is used.

2. When replacing 6SJ7 for howl or other defect, try several 6SJ7 tubes to pick one with lowest microphonism. 5879 tubes are low microphonic tubes and need not be picked.

Bracket To Eliminate Belt-Throwing -

An idler study bracket is used in late models to eliminate throwing of the rubber drive belt. If this trouble is experienced in early models this bracket can be obtained from the factory by the dealer or distributor on a no-charge basis. Complete installation instructions are included with the bracket.

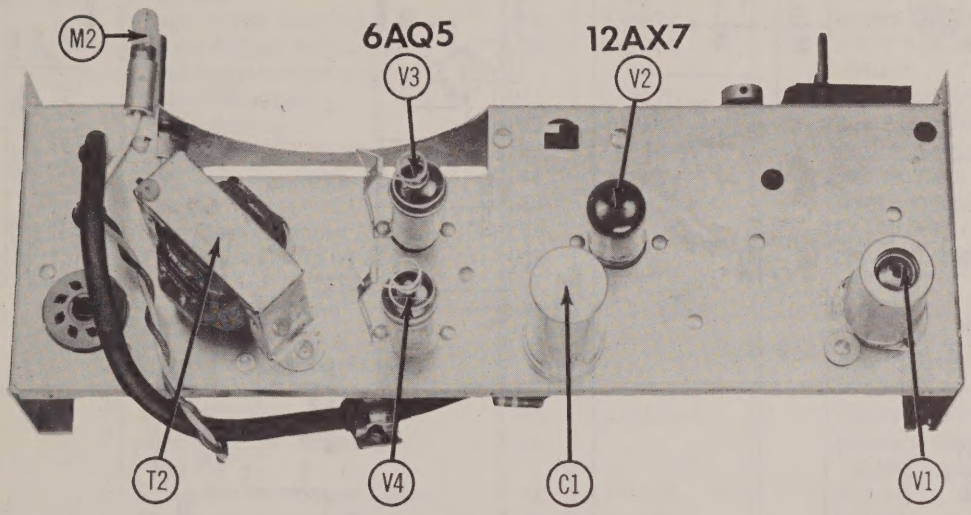


Figure 7

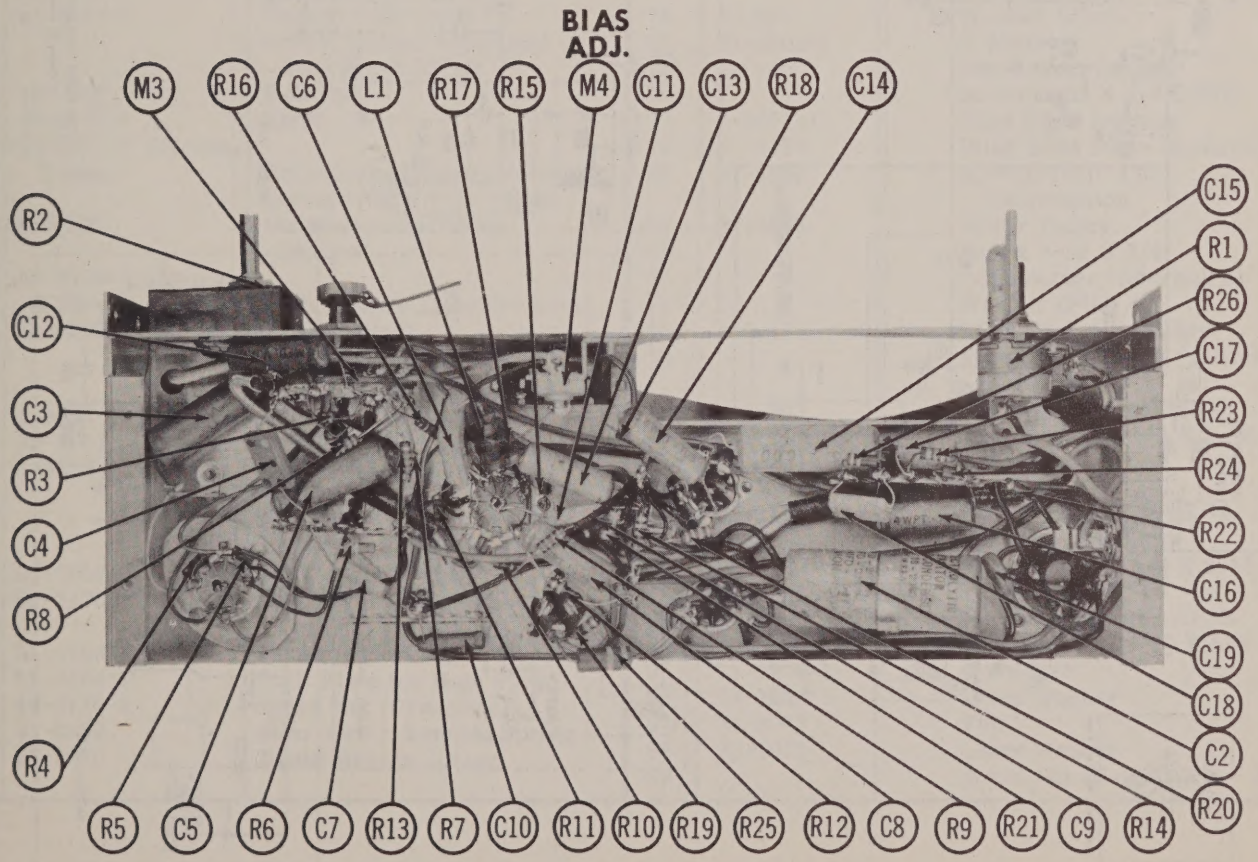
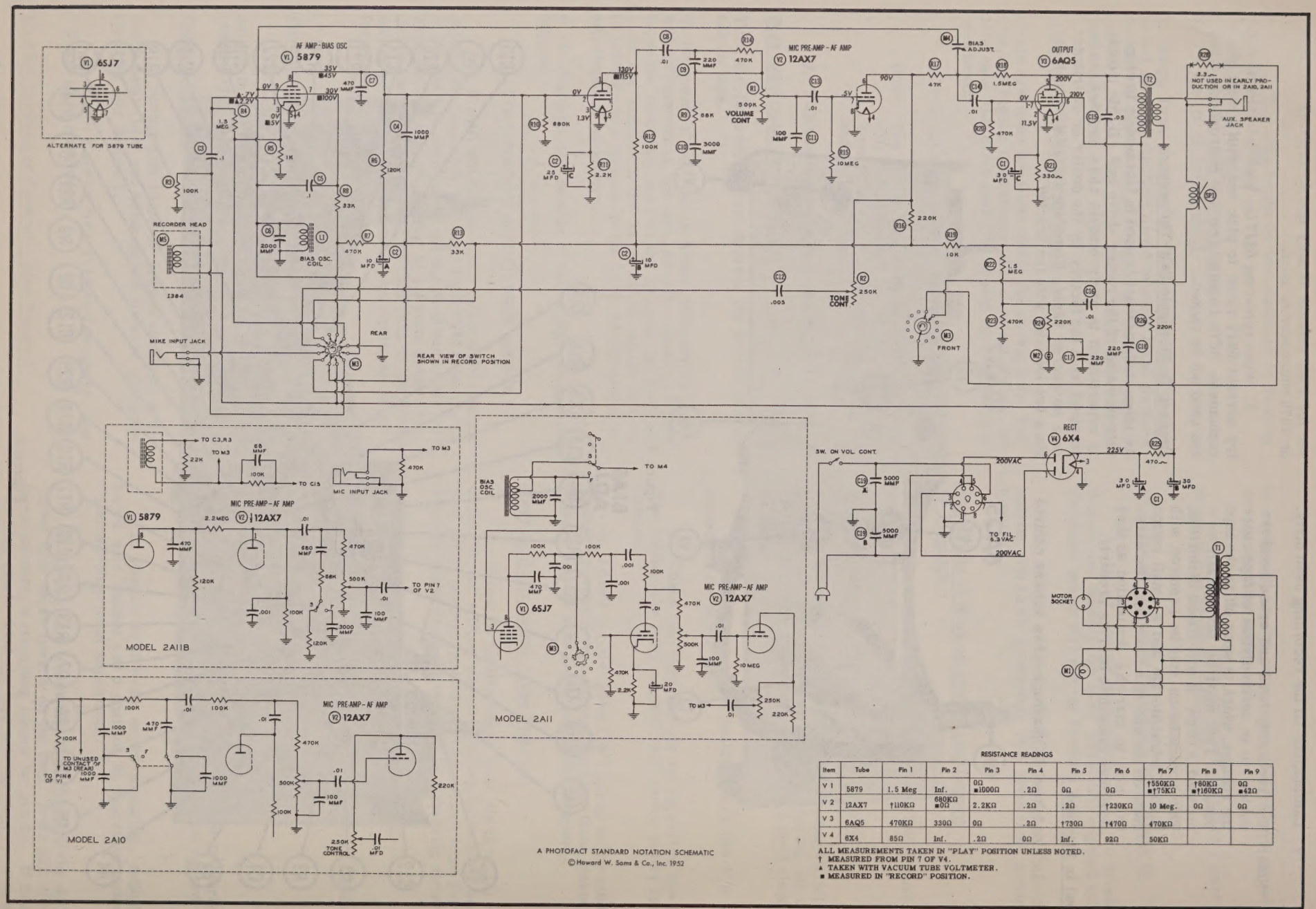


Figure 8.



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	5879	1.5 Meg	Inf.	0Ω ■1000Ω	.2Ω	0Ω	0Ω	†550KΩ ■†75KΩ	†80KΩ ■†160KΩ	0Ω ■42Ω
V 2	12AX7	†110KΩ	680KΩ ■0Ω	2.2KΩ	.2Ω	.2Ω	†230KΩ	10 Meg.	0Ω	0Ω
V 3	6AQ5	470KΩ	330Ω	0Ω	.2Ω	†730Ω	†470Ω	470KΩ		
V 4	6X4	85Ω	Inf.	.2Ω	0Ω	Inf.	92Ω	50KΩ		

ALL MEASUREMENTS TAKEN IN "PLAY" POSITION UNLESS NOTED.
† MEASURED FROM PIN 7 OF V4.
▲ TAKEN WITH VACUUM TUBE VOLTMETER.
■ MEASURED IN "RECORD" POSITION.

Figure 9. Circuit Schematic Diagram Model 2A10B. (See inserts for Models 2A10, 2A11, 2A11B.)

PROPERTY OF L. F. BLANKENSHIP 1004 MEADE ST. DENVER, COLORADO

Ref. No.	Part No.	Description
1	40-2152	Speed Shift Knob
2	28-2070	Rear Cover Escutcheon
3		Screw 6-32 X 3/16 BHMS
4	111-32-1	Reel pan for feed reel
5		Nut, Hex 6-32 CP
6	148-5-1	Tape Guide Post
7	28.151	Felt Washer
8		Flat Washer 1/2 X 3/16 X 1/32
9	97-3065	Erase Head Retracting Spring
10	63-2183	Tape Guide Post Spacer
11	16-2005	Pinch Roller Retaining Spring (Hairpin clip)
12	28.151	Thrust Washer
13	70-2026	Pinch Roller
14		Speed Nut 3/8-32 Palnut
15	111-33-1	Reel Pan for Take Up Reel
16	97-3071	Reel Drive Spring
17		Flat Washer 1/2 X 3/16 X 1/32
18	51-3179-1	Erase Head Plate
19	97-3068	Spring
20	110-41-1	Record Actuating Lever
21	51-3180-1	Pinch Roller Plate
22	See M5	Tape Recording Head
23	97-3066	Pinch Roller Tension Spring
24	110-40-1	Playback Actuating Lever
25	51-3166-1	Playback Slide Plate
26	97-3064	Pressure Pad Spring
27	51-3167-1	Record Slide Plate
28		Screw (Spring Adjusting) 6-32 X 3/8 RHMS
29	101-206	Felt Pad
30	40-2149-1	Knob
31	28-2071-1 Maroon, 2 Blue	Escutcheon (Specify color)
32		Screw 6-32 X 7/16 RHMS
33	5-3238	Pushbutton Retaining Bracket
34	40-2150-1 Maroon, 2 Blue, 3 Green	Push Buttons (Specify Color)
35	58-3050	Capstan Shaft
36		Screw (For Input Jack) 6-32 X 1/4 Philips HDMS
37	5-3247-1	Input Jack Bracket
38	97-3067	Push Button Return Spring
39	5-3239-1	Hinge Bracket for Push Buttons
40		Screw 6-32 X 1/4 Philips HDMS
41	97-2029	Lock Plate Spring
42	51-3170-1	Locking Plate for Push Buttons
43	51-3168-1	Brake Slide Plate
44	51-3164-1	Shift Plate for High Speed
45	48-2175-3	Speed Nut (Presthole)
46	97-3068	Idler Lever Tension Spring
47	97-3070	Brake Return Spring
48	51-320-1	Sub-Idler
49	79-2027	Sub-Idler
50		Screw
51		Thrust Washer
52	16-2005	Spring (Hairpin Clip)
53	58-3043	Speed Control Shaft
54	79-2029	Idler Drive Sheave
55		Lock Nut (Palnut) 3/8 - 32
56	110-52-1	Idler Lever
57	27-2068	Idler Drive Belt
58	79-2028	Drive Wheel
59	27-2072	Brake Drum
60	79-2010	2 1/2" Rubber Bonded Idler
61	97-3072	Idler Spring
62	110-46	Equalizer Switch Lever
63	110-48-B	Switch Lever Assembly
64	2-3104	Switch Arm Link
65	27-2073	Brake Drum
66		Lockwasher #6
67		Screw 6-32 X 1/4 Phillips HDMS
68	51-3173-1	Motor and Transformer Mounting Plate
69		Flat Washer 3/8 X 3/16 X 1/32
70	73-2231-6	Lockwasher
71		Screw 6-32 X 5/16 Phillips HDMS
72	47-2099	Motor
73	16-2005	Retaining Spring (Hairpin Clip)
74	28.151	Washer (Flat)
75	73-2302-1	C Washer
76	110-45	Speed Shift Lever
77		Screw 6-32 X 1/4 BHMS
78	6-3067-1	Idler Slide Bushing
79	51-3124	Idler Slide Plate Assembly
80	97-3069	Spring, Idler Lift Compression
81	27-2066	Motor Pulley
82		Screw 8-32 X 3/8
83		Lockwasher (Internal) #8
84		Washer (Flat) #8
85	110-47	Idler Throw-out Lever
86		Screw 8-32 X 1/4 Phillips HDMS
87		Lockwasher Internal #8
88		Washer (Flat) 1/2 X 3/16 X 1/32
89		Nut 8-32
90	51-3174-1	Motor Adapter Plate
91	35-2018	Mounting Grommet
92		Washer (Flat) 1/2 X 3/16 X 1/32
93		Lockwasher Internal #8
94		Screw (Sems) 8-32 X 5/8
95	73-2302-1	C Washer
96	73-2051	Linen Washer
97	34-2042	Fan
98	73-2051	Linen Washer
99		Speed Nut (Palnut) 3/8 - 32

Item No.	Part No.	Use and Description
V1A	69-2222	AF Amp. Bias Osc., 5879
V1B		AF Amp. Bias Osc., 6SJ7
V2	69-2175	Mike Preamp., AF Amp. 12AX7
V3	69-2171	Audio Output, 6AQ5
V4	69-2172	Rectifier, 6X4
C1A	18-2079	Filter, 30 mfd. @ 250 V
C1B		Filter, 30 mfd. @ 250 V
C1C		Audio Output Cath., 30 mfd. @ 25 V
C2A	18-2080	Decoupling (Red), 10 mfd. @ 200 V
C2B		Decoupling (Blue), 10 mfd. @ 200 V
C2C		Mic Preamp. Cath. (Yellow), 25 mfd. @ 25 V
C3	75-2005	Audio Coupling, .1mfd. @ 200 V
C4	76-2207	Audio Coupling, 1000 mmf. @ 500 V
C5	75-2005	Osc. Coupling, .1 mfd. @ 200 V
C6	76-2255	Fixed Trimmer, 2000 mmf. @ 500 V
C7	76-2208	AF Amp. Plate, 470 mmf. @ 500 V
C8	75-2063	Audio Coupling, .01 mfd. @ 400 V
C9	76-2286	Tone Comp., 220 mmf. @ 500 V
C10	76-2287	Tone Comp., 3000 mmf. @ 500 V
C11		Tone Comp., 100 mmf. @ 500 V
C12	75-2088	Tone Comp., .005 mfd. @ 600 V
C13	75-2063	Audio Coupling, .01 mfd. @ 400 V
C14	75-2063	Audio Coupling, .01 mfd. @ 400 V
C15	75-2062	Audio Coupling, .05 mfd. @ 400 V
C16	75-2063	Indicator Coupling, .01 mfd. @ 400 V
C17	76-2209	Indicator Filter, 220 mmf. @ 500 V
C18	76-2209	Tone Comp., 220 mmf. @ 500 V
C19A		Line Filter, 5000 mmf., See Note 1
C19B		Line Filter, 5000 mmf. @ 400 V
Note 1. Some sets may use two .01 mfd. Capacitors in this application.		
R1	19-2194-5	Volume Control, 500K Ohm @ 1/2 W
R2	19-2190-4	Tone Control, 250K Ohm @ 1/2 W
R3	53-2053	Isolation, 100K Ohm @ 1/2 W, See Note 5.
R4	53-2043	AF Amp. -Bias Osc. Grid, 1.5 Meg 1/2 W
R5	53-2271	AF Amp. -Bias Osc. Cath., 1K Ohm 1/2 W
R6	53-2738	AF Amp. -Bias Osc. Plate, 120K Ohm 1/2 W
R7	53-2596	Voltage Divider, 470K Ohm, 1/2 W
R8	53-2641	AF Amp. Screen, 33K Ohm, 1/2 W
R9	53-2513	Tone Compensation, 68K Ohm, 1/2 W
R10	53-2598	Mic. Preamp. Grid, 680K Ohm, 1/2 W
R11	53-2620	Mic. Preamp. Cath., 2.2K Ohm, 1/2 W
R12	53-2053	Mic. Preamp. Plate, 100K Ohm, 1/2 W
R13	53-2641	Decoupling, 33K Ohm
R14	53-2596	Tone Compensation, 470K Ohm, 1/2 W
R15	53-2546	AF Amp. Grid, 10 Meg. 1/2 W
R16	53-2551	AF Amp. Plate, 220K Ohm, 1/2 W
R17	53-2609	Feedback Network, 47K Ohm, 1/2 W, See Note 6.
R18	53-2043	Feedback Network, 1.5 Meg. 1/2 W
R19	53-2047	Decoupling, 10K Ohm 1/2 W
R20	53-2596	Output Grid, 470K Ohm 1/2 W
R21	53-2561	Output Cath., 330 Ohm 1 W
R22	53-2043	Indicator Network, 1.5 Meg. 1/2 W
R23	53-2596	Indicator Network, 470K Ohm, 1/2 W, See Note 2.
R24	53-2551	Indicator Network, 220K Ohm, 1/2 W
R25	53-2661	Filter, 470 Ohm, 2 W, See Note 3.
R26	53-2551	Indicator Network, 220K Ohm, 1/2 W
R27		Filter, 1000 Ohm, 1 W, See Note 4.
R28	53-2763	Voice Coil Shunt, 3.3 Ohm, 1 W
Note 2. Value adjusted in production for proper recording indicator level.		
Note 3. Model 2A11 uses a 1000 ohm resistor in this application.		
Note 4. Used in 2A11 only.		
Note 5. Not used in 2A11.		
Note 6. Not used in all models.		
T1	80-2198	Power Transformer
T2A	81-2110-2	Output Transformer, (2A10 Series)
T2B	81-2106-3	Output Transformer, (2A11 Series)
SP1	64-2108	3.2 Ohm, PM Speaker
L1A	17-3137-A	Bias Osc. Coil, (2A10 Series)
L1B	17-3132-A	Bias Osc. Coil, (2A11 Series)
M1		Dial Light, 6-8 V, .15 Amp. Type #47
M2	45-2036	Neon Bulb Type NE51, Recording Level Indicator
M3	66-3046	Play Record Switch
M4	78-2065	Trimmer, Bias Adj., (3-35 mmf.)
M5		Record Head, See Note 7
	8-2379-A	Cabinet (Model 2A10)
	8-2379-B	Cabinet (Model 2A11)
	40-2153-1	Knob (Plain)
	40-2153-2	Knob (With Dot)
	108-28-1	Microphone

Note 7: (a) Shure Model TR6 Record Head used in early 2A10, Part No. 55-2081.

(b) Shure Model 1384 and TR-16A Record Head used in some 2A10 and all 2A10B Part No. 55-2079.

(c) Shure Model TR16 Record Head used in all 2A11, 2A11B, Part No. 55-2082.